

SIEMENS

SONOLINE Antares
Ultrasound Imaging System
System Reference



SONOLINE Antares Ultrasound Imaging System System Reference

Software Version 2

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CE Declaration

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Reorder number for user and reference manuals: 7304020

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April 2003
Printed in the United States of America.

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About This Manual

The user and reference manuals for this product include the following:

The *Instructions for Use* provides instructions on caring for, maintaining, cleaning, disinfecting, and using the ultrasound imaging system. The *Instructions for Use* also contains information on caring for, cleaning, disinfecting, and storing transducers and their accessories.


The *System Reference* provides information regarding the ultrasound imaging system. It is organized by the following categories: *Image*, *Calcs*, *Patient Data*, and *Resources*.


The *Transducer Reference* provides acoustic power intensities and mechanical and thermal index (MI/TI) information for the transducers compatible with the ultrasound imaging system.

Conventions

Conventions used throughout this manual are listed below. Take a moment to familiarize yourself with these conventions.

Warnings, Cautions, and Notes

 **WARNING:** Warnings are intended to alert you to the importance of following the correct operating procedures where risk of injury to the patient or system user exists.

 **Caution:** Cautions are intended to alert you to the importance of following correct operating procedures to prevent the risk of damage to the system.

Note: Notes contain information concerning the proper use of the system and/or correct execution of a procedure.

Control Panel Keys and Controls

Controls and keys located on the control panel are identified by uppercase boldface type.

Example: Rotate the **MENU** control.

Keys located on the keyboard are identified by boldface type.

Example: Press the **Patient** key located on the keyboard.

On-Screen Objects

On-screen objects such as task card tabs, menu selections, buttons, entry fields, names of forms and dialogs, and group boxes are identified by boldface type.

Example: The system displays the **Image** task card.

Selection of On-Screen Objects

The **SELECT** key on the control panel functions as a point-and-select device when used with the trackball (similar to a computer mouse). To select an on-screen object (such as a task card tab or a button), roll the trackball to position the pointer (cursor) on the object and then press the **SELECT** key on the control panel.

Special Terms

Special terms are indicated in boldface italicized text and are accompanied by a brief description on their first use in the manual.

Example: When the trackball is used to make menu selections, it is assigned to the ***pointer*** function.

Cross References

When additional information exists within this or other manuals, a reference graphic and the name of the book is provided in the right column. If the information exists within the chapter, a cross-reference to the page number is listed. Otherwise, information is referenced by topic and chapter number. The *System Reference* organizes information by category, topic, and chapter number.

In the **System Reference** example, Image and Resources are categories; Imaging and Accessories and Options are topics; Ch 1 and Ch 2 are chapter numbers.



Transducer Reference

Acoustic Tables Ch 1



Instructions for Use

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System Presets

You can use the options and settings available in the system presets menu to set up the ultrasound system with your preferences. Presets define the configuration of the system software whenever you power on the system.

You can press the **Presets** key on the keyboard or select the **Presets** button on the image screen to access the system **Presets** menu.

A complete listing of system presets is located in the *System Reference*. Whenever a system preset is discussed in other chapters or in the User and Reference Manuals, a graphic is provided in the right column.

The graphic identifies a preset option or setting in the system presets menu that is available for you to customize your ultrasound system. The name of the category on the menu containing the system preset is listed for your convenience.

Example: Use the system presets to set the number of heart cycles to include between the two vertical lines.



**System-wide
Measurement Tools**

Table of Contents

System Reference

Chapter Title	Chapter Description
Image	
Chapter 1 Imaging Functions	Procedures explaining how to use general imaging mode features.
Chapter 2 2D-Mode and M-Mode Imaging Functions	Descriptions of the imaging functions for 2D-mode and M-mode imaging. Includes an explanation of Ensemble™ Tissue Harmonic Imaging. Describes the following system options: <ul style="list-style-type: none">▪ SieClear™ Multi-View Spatial Compounding▪ TEQ™ ultrasound technology (Tissue Equalization)
Chapter 3 Color Flow Imaging	Procedures for Color Doppler and Power Doppler imaging.
Chapter 4 Doppler Functions	Procedures for Doppler functions.
Chapter 5 CINE	Information on how to review CINE data, either frame by frame or as a loop, and how to edit the loop of data.
Chapter 6 Biopsy	Description of biopsy/puncture guidelines, including the needle path verification procedure.
Chapter 7 Physio	Description of the ECG option.
Chapter 8 SieScape Imaging	Explanation of the SieScape™ Panoramic Imaging option.
Chapter 9 Cadence Contrast Agent Imaging	Explanation of the Cadence™ Contrast Agent Imaging technology option.
Chapter 10 3-Scape Imaging	Explanation of the 3-Scape™ Real-Time 3D Imaging option.
Calcs	
Chapter 1 Measurements and Calculations	Description of the Measurement function and description of the Calcs task card. Step-by-step procedures for using the basic measurement and compound measurement tools. Includes an explanation of patient reports, annotations, and pictograms.
Chapter 2 Application-Specific Measurements and Calculations	Description of application-specific measurement labels. Refer to Calcs Chapter 1 for a description of the basic measurement and compound measurement tools.
Chapter 3 Obstetric Measurements, Calculations, and Reports	Description of the obstetrical measurement and report package. Refer to Calcs Chapter 1 for a description of the basic measurement and compound measurement tools.

Chapter Title	Chapter Description
Patient Data	
Chapter 1 Patient Data Management	Instructions for viewing, printing, and managing patient data using the patient browser, Review task card, and Filming screen.
Chapter 2 Documentation Devices	Information on using documentation devices, including the VCR and compact disk (CD) drive. Includes troubleshooting tips.
Resources	
Chapter 1 System Presets	Instructions for using the options in the system presets to customize the system.
Chapter 2 Accessories and Options	Listing of the available configurations of the ultrasound system.
Chapter 3 Clinical References	Listing of authors used in the ultrasound system for the Obstetric application.
Chapter 4 Communications and Networking	Explanation of the setup procedures for the DICOM (Digital Imaging and Communications in Medicine) Connectivity option and setup procedures for RS-232 connectivity.

Note: Not all features and options described in this publication are available to all users. Please check with your Siemens representative to determine the current availability of features and options.

1 Imaging Functions

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Imaging Function ■ Overview

You can activate each mode of operation using the mode controls located on the control panel. Mode-specific menus and selections display on the left side of the screen in the **Image** task card. Each imaging mode has a mode-dependent **Parameter menu** used to adjust imaging parameters, such as dynamic range, transmit frequency, and edge enhancement.

Controls for imaging formats and mixed-mode Update Styles, SieScape™, 3-Scape™, on-screen Biopsy guidelines, VCR recording, and Physio settings are organized into group boxes that display below the Parameter menu on the screen. Other controls for optimizing an image are located on the control panel.



Instructions for Use

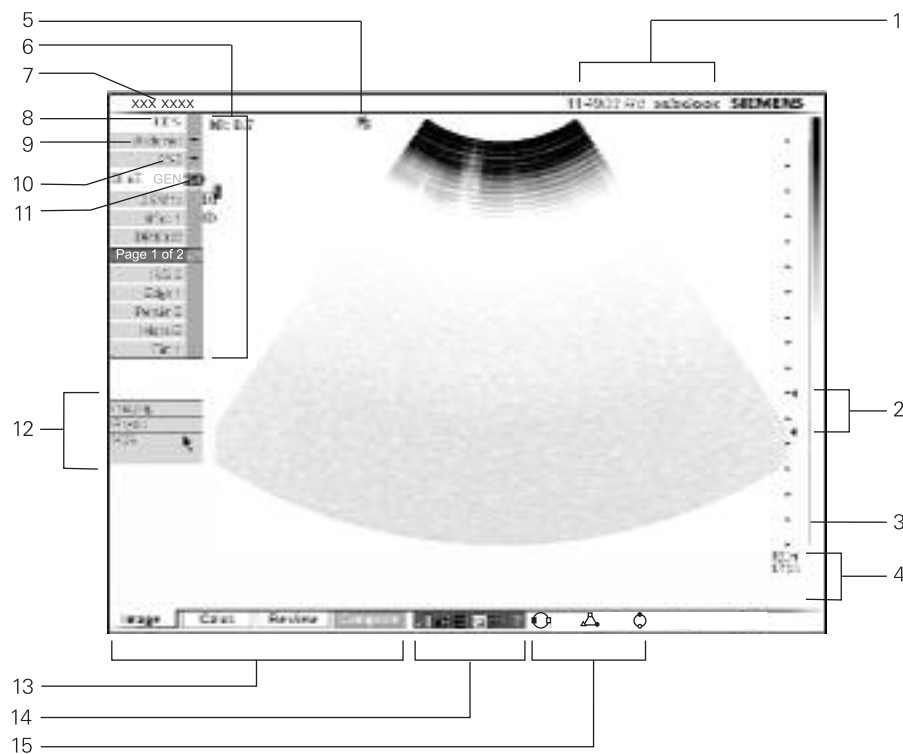
Mode controls Ch 3

Priority Mode

A mode must have visibility or **priority** over any other active modes for you to adjust the controls or make menu selections for that mode. The system applies priority to the most recently activated mode, which is indicated on the Parameter menu. When an additional mode is activated or is selected, the previous mode with priority remains active, but it is no longer the priority mode. More than one mode may be active at any given time, for example, 2D-mode and Doppler, but only one mode is the priority mode.

You can change the priority mode during mixed-mode imaging by pressing the **PRIORITY TOOL** key.

Image Task Card



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Example of an image screen with the **Image** task card active.

- | | | | |
|----|---|----|--|
| 1 | Date and Time | 11 | Priority mode indicator on the Parameter menu |
| 2 | Focal Point markers | 12 | Group boxes (Imaging , VCR , and Physio) |
| 3 | DGC curve | 13 | Task card tabs (Image , Calcs , Review , Compose) |
| 4 | Image status (depth, zoom, fps for playback, VCR, Cine playback rate, frame number) | 14 | Shortcut buttons. Accesses the Patient Registration , Report , Patient Browser , Filming screen, system presets, and the online Help . They are an alternative to the function keys on the keyboard. |
| 5 | Transducer Orientation Indicator | 15 | Trackball status icons |
| 6 | Parameter menu | | |
| 7 | Patient Data | | |
| 8 | Transmit Power | | |
| 9 | Exam type drop-down menu | | |
| 10 | Transducer drop-down menu | | |

Imaging Parameter Selection

The **DEPTH**, **FOCUS**, and **ZOOM** controls are functions assigned to dedicated controls on the control panel. For all other imaging parameters, there are up to three methods available for selecting an imaging parameter and changing its setting.

- Using one of the two **UNIVERSAL** controls.
- Highlighting a selection on the Parameter menu using the trackball and **SELECT** key, then changing the setting using the **MENU** control.
- Highlighting and then changing the setting of a selection on the Parameter menu by using the **MENU** control.

Note: Not all settings can be changed using all three methods. The function of the **UNIVERSAL** controls on the control panel is mode-specific.

Example: Three Methods to Change Transmit Frequency

There are three methods available to change the transmit frequency of a transducer when 2D-mode is the priority mode.

To use the mode-specific dedicated control:

- Push up on the **UNIVERSAL 1** control to increase the transmit frequency; push down on the control to decrease the transmit frequency.

To use the **MENU** control:

1. Rotate the **MENU** control to highlight the **x.xx MHz** (transmit frequency) selection on the Parameter menu.
2. Press the **MENU** control to activate the selection.
3. Rotate the **MENU** control clockwise to increase the transmit frequency; rotate the control counterclockwise to decrease the transmit frequency.
4. Press the **MENU** control to confirm the setting and disengage the control.

To use the Trackball and **MENU** control:

Note: If the trackball is assigned to a tool on the image area of the screen, then press the **SELECT** key to change the assignment of the trackball to the pointer function.

1. Roll the trackball pointer to the **x.xx MHz** (transmit frequency) selection on the Parameter menu and then press the **SELECT** key.
2. Rotate the **MENU** control clockwise to increase the transmit frequency; rotate the control counterclockwise to decrease the transmit frequency.



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Using the Universal Controls

Use the **UNIVERSAL 1** and **UNIVERSAL 2** controls to change the setting of an image parameter based on the priority mode. For example, during M-mode imaging, the **UNIVERSAL 1** control is assigned to changing the setting of the transmit frequency, and the **UNIVERSAL 2** control is assigned to changing the speed of the M-mode sweep.

Mode	Universal 1 control	Universal 2 control
2D-mode	Transmit Frequency	Number of Focal Points
M-mode	Transmit Frequency	Sweep Speed
Doppler	PRF	Baseline
Color	PRF	Flow State

To use a UNIVERSAL control:

- Push up on the control to increase the setting; push down on the control to decrease the setting.

Using the Menu Control

The **MENU** control allows you to navigate through selections on the Parameter menu, drop-down menus, and group boxes, and then adjust the settings.

To use the MENU control:

Note: A Parameter menu may have two pages of selections. To access the menu selections, roll the trackball to the **Page 1 of 2** indicator or the **Page 2 of 2** indicator on the Parameter menu and then press the **SELECT** key.

1. Rotate the **MENU** control to highlight a selection.
2. Press the **MENU** control to activate the selection.
3. Rotate the **MENU** control clockwise to increase the setting; rotate the control counterclockwise to decrease the setting.
4. Press the **MENU** control to confirm the setting and disengage the control from the menu selection.

Using the Trackball and Trackball Controls

The trackball is used with on-screen tools, such as the 2D field of view (FOV) and the Doppler cursor, or it is used to make selections from the Parameter menu, drop-down menus, and group boxes.

Pointer Function

When the trackball is used with on-screen tools, it is assigned to the function of that tool; the trackball cannot be used to make menu selections. When the trackball is used to make menu selections, it is assigned to the *pointer* function; the trackball cannot be used with the on-screen tools. You must reassign the trackball to the required function.



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To reassign the trackball to a function:

- When the trackball is assigned to controlling an on-screen tool, press the **SELECT** key to reassign the trackball to the pointer function for use with the menus and group boxes.
- When the trackball is assigned to controlling the pointer function, you can use the trackball to position the pointer over the image screen and then press the **SELECT** key to assign the trackball function to the default mode tool for the active mode (for example, the 2D FOV for 2D-mode).

Parameter Selection

If the trackball is assigned to a tool on the image area of the screen, then press the **SELECT** key to change the assignment of the trackball to the pointer function.

To make a selection from the Parameter menu with the trackball:

Note: A Parameter menu may have two pages of selections. To access the menu selections, roll the trackball to position the pointer on the **Page 1 of 2** indicator or on the **Page 2 of 2** indicator on the Parameter menu and then press the **SELECT** key.

1. While the trackball is assigned to the pointer function, roll the trackball to position the pointer on a menu selection and then press the **SELECT** key.
2. Rotate the **MENU** control to change the setting of the parameter.

Trackball Controls

You can also use the trackball in conjunction with the trackball controls located on the control panel.

Select

When the pointer (cursor) is positioned over the image screen, pressing the **SELECT** key alternates the trackball function between a pointer (cursor) and the default mode tool for the active mode (for example, the 2D FOV for 2D-mode).

When the pointer is positioned over the menus or group boxes, the **SELECT** key allows you to interact with a menu, drop-down menus, and group boxes.



SELECT key.

Update View

The function of the **UPDATE VIEW** key is dependent on the active mode and the active task card. When viewing a format with more than one 2D image, the **UPDATE VIEW** key cycles through the images. During Doppler, the key toggles a real-time 2D image with a real-time Doppler spectrum.



UPDATE VIEW key.

Priority Tool

Each mode has a default tool that is under the control of the trackball when you activate the mode.

Mode	Default Tool	On-screen Tool Name
2D-mode	2D field of view	2D FOV
Doppler	Doppler gate	D Gate
M-mode	M-mode cursor	M Line
Color	Color region of interest	C ROI



PRIORITY TOOL key.

During mixed-mode imaging, press the **PRIORITY TOOL** key to reassign the trackball from controlling the tool of one mode to controlling the tool of another mode. For example, during 2D/Doppler mode, pressing the **PRIORITY TOOL** key toggles the trackball assignment of the 2D-mode tool, **2D FOV**, with the Doppler tool, **D Gate**.



The system displays the **Priority Tool** icon on the lower right of the screen and indicates the tool currently assigned to the trackball for the priority mode.

Next

For each mode, there are specific tools that are under control of the trackball.

Tool	Function
2D FOV	<ul style="list-style-type: none">Adjust the size of the FOV
D Gate	<ul style="list-style-type: none">Position the gate on the Doppler cursorSteer the Doppler cursor
M Line	<ul style="list-style-type: none">Position the gate on the M cursorAdjust the size of the gateSteer the M cursor
C ROI	<ul style="list-style-type: none">Position the ROIAdjust the size of the ROISteer the ROI for linear transducers

Press the **NEXT** key to cycle through the functions of the tool for the priority mode. For example, during Color imaging, pressing the **NEXT** control cycles through the functions of the Color ROI. You can use the trackball to position the Color ROI, to adjust the size of the Color ROI, and to steer the Color ROI.



NEXT key.



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The system displays the **Next** icon on the lower right of the screen and indicates the function under control of the trackball.

Drop-Down Menus and Group Boxes

In addition to the Parameter menu, the **Image** task card contains imaging selections in a drop-down menu or a group box:

- Transducer drop-down menu – Allows you to activate a transducer different from the one activated during completion of the **Patient Registration** form.
- Exam type drop-down menu – Allows you to select a configuration of imaging presets by exam type for image optimization. The system uses the study type selected in the **Patient Registration** form for patient records.
- Imaging group box – Allows you to select a screen format for 2D imaging or activate an installed system option. Also contains selections for horizontally or vertically rotating an image.

During 2D-mode, the Imaging group box also includes the Biopsy angle selections, which activates on-screen guidelines for use with the Biopsy function. You must select the on-screen angle that corresponds to the angle of the needle guide attached to a transducer.

During Doppler, the group box contains pull-down menus for determining the Update style of your 2D image and Doppler spectrum.

- Physio group box – When the option is installed on your system, the group box provides ECG selections.
- VCR group box – When the option is installed on your system, the group box allows you to control the VCR directly from the **Image** task card.



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Accessing a Group Box

Selections for **Imaging**, **Physio**, and **VCR** operation are each identified on the **Image** task card below the Parameter menu as a group box. You can expand (open) or hide the contents of a group box by using either the **MENU** control or the trackball and **SELECT** key.

To expand or hide a group box using the MENU control:

1. Rotate the **MENU** control to highlight the group box.
2. Press the **MENU** control to expand or hide the group box that displays the controls and selections.

To expand or hide a group box using the trackball controls:

Note: If the trackball is assigned to a tool on the image area of the screen, then press the **SELECT** key to change the assignment of the trackball to the pointer function.

1. When the trackball is assigned to the pointer function, roll the trackball to position the pointer on the desired group box.
2. Press the **SELECT** key to expand or hide the contents of the group box.

Accessing a Drop-Down Menu

The transducer and exam type drop-down menus are identified on the **Image** task card above the Parameter menu by an arrow. All drop-down menus have an arrow. A group box, such as the **Imaging** group box during Doppler, may contain a drop-down menu. You can expand (open) the contents of a drop-down menu by using either the **MENU** control or by using the trackball and **SELECT** key.

To expand a drop-down menu using the MENU control:

1. Rotate the **MENU** control to highlight the drop-down menu.
2. Press the **MENU** control to expand the drop-down menu and display the list of selections on the menu.

To expand a drop-down menu using the trackball controls:

Note: If the trackball is assigned to a tool on the image area of the screen, then press the **SELECT** key to change the assignment of the trackball to the pointer function.

1. When the trackball is assigned to the pointer function, roll the trackball to position the pointer on the arrow of a drop-down menu.
2. Press the **SELECT** key to expand the drop-down menu and display the list of selections on the menu.

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Activating 2D-Mode

2D-mode is the default imaging mode for the ultrasound system. It indicates brightness, or two-dimensional (2D) gray scale imaging.

To activate 2D-mode:

- Press the **2D** control on the control panel.

The Parameter menu lists 2D-mode menu selections, and the system assigns control of the trackball to the pointer.

The **Imaging** group box displays 2D format selections.

The **UNIVERSAL 1** control is assigned to **Transmit Frequency**, and the **UNIVERSAL 2** control is assigned to **Focal zones**.

Note: When operating in mixed modes (for example, 2D-mode with M-mode, 2D-mode with Doppler, or 2D-mode with Color), pressing the **2D** control exits all modes and activates 2D-mode imaging.



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IMAGE:
Example screen
layout Ch 1












Mode Formats and Display Options

The **Imaging** group box provides a variety of display options for 2D-mode images. Using the selections, you can:

- Access optional features.
- Display advanced imaging options.
- Display 2D-mode images in different formats.
- Change the image orientation.

Imaging Group Box

You can display 2D-mode images in different formats: Full, Dual, Seamless Dual, Linear, or Sector. You access these formats from the **Imaging** group box. Selections are toggled on and off using the format buttons.

Icon	Format	Description
	2D	Displays 2D format options
	SieScape	Displays selections for the SieScape™ Panoramic Imaging option
	3-Scape	Displays selections for the 3-Scape™ Imaging option
	Linear	Linear transducer format for linear transducers
	Sector	Sector transducer format for linear transducers
	L/R	Horizontally (L/R Flip) rotates an image
	U/D	Vertically (U/D Flip) rotates an image
	Full	Full screen 2D image
	Dual	2D+2D (if Seamless Dual is OFF in system presets)
	Seamless Dual	2D+2D with no separation (if Seamless Dual is ON in system presets)
	Tissue Equalization Refresh	Automatically optimizes the overall FOV image brightness uniformity This button is available only when a function other than TEQ™ ultrasound technology (Tissue Equalization) is assigned to the UPDATE VIEW key (for example, during mixed 2D/Doppler imaging or when multiple 2D images are being viewed). TEQ is an optional feature.

Note: Only one Dual format button displays in the **Imaging** group box for 2D-mode image formats. Select **Seamless Dual** or **Dual** format display in system presets.



Basic System

In the Dual and Seamless Dual format, more than one 2D image can display on the screen. You adjust imaging parameters for one image at a time. This image is the **active** image. The system indicates the active image by highlighting the transducer orientation indicator.

Mixed-Mode Formats

The following mixed-mode formats are available. In each mixed mode, the displayed images can have different post processing attributes.

- 2D/M-mode
- 2D/Doppler
- 2D-mode with color
- 2D-mode with power
- 2D/Doppler with color
- 2D/Doppler with power

Activating Dual and Seamless Dual Formats

In Dual format, two acquired images display side-by-side on the image screen. Both images are obtained separately, and only one image displays in real-time. The Dual format is available for all imaging transducers.

In Seamless Dual-format, two acquired images display side-by-side on the image screen with no separation between them. Both images are obtained separately, and only one image displays in real-time.

When you first activate the Dual or Seamless Dual format, the imaging settings from the imaging mode are applied to the first image. The second image retains the same settings as the first image.

Note: Only one Dual format button displays in the **Imaging** group box for 2D-mode image formats. Select **Seamless Dual** or **Dual** format display in system presets.

To select the Dual or Seamless Dual format:

1. Access the **Imaging** group box and select the **Dual** (or **Seamless Dual**) button.

An image displays in real-time on the left side of the screen.

2. Press the **UPDATE VIEW** key to freeze the left image and display the right image in real-time.

3. Press the **UPDATE VIEW** key to freeze the right image and display a real-time image on the left. If selected in system presets, you can also press the **FREEZE** key to freeze the right image and activate the **Calcs** task card.

Only one image can be active at any one time. The active image is indicated by the highlighted transducer orientation indicator.

4. To display a full screen image, select the **2D** button or the **Full** button from the Imaging group box. Select the **Dual** (or **Seamless Dual**) button to reactivate the side-by-side display.

When viewing **Dual**-, or **Seamless Dual**-format, the setting displays only for the active image. If the image is frozen, the values indicate the setting at the time the image was frozen.



Basic System

Activating M-Mode

System display in M-mode depends on cursor selection in system presets.

- **Cursor On** – If the cursor mode is set to **ON** in Doppler/M-mode Setup Options in system presets, the M-mode cursor displays on the 2D image when M-mode is first activated.

The cursor represents the acoustic line along which the M-mode information is gathered. The cursor displays as a green line, and you can position the cursor using the trackball.

- **Cursor Off** – If the cursor mode is set to **OFF**, the system simultaneously displays a 2D image and the M-mode sweep when M-mode is activated.

When M-mode is the priority mode:

- The Parameter menu lists M-mode selections.
- The **Imaging** group box displays **Update** menu selections.
- The system assigns control of the trackball to the positioning and steering of the M-mode cursor.
- The **UNIVERSAL 1** control is assigned to **Transmit Frequency**, and the **UNIVERSAL 2** control is assigned to **Sweep Speed**.

To activate M-mode with Cursor ON:

1. Press the **M** control.
The system displays an M-mode cursor on the 2D image.
2. Roll the trackball to position the M-mode cursor on the area of interest.
3. Press the **M** control a second time.
The system displays an M-mode sweep and the 2D image according to the format selected in the Presets menu.
4. Press the **SELECT** key.
The system reassigns trackball control to the pointer function.
5. Press the **PRIORITY TOOL** key to reassign trackball control to the imaging area on the screen.

To activate M-mode with Cursor OFF:

1. Press the **M** control.
The system displays an M-mode cursor on a 2D image and an M-mode sweep according to the format selected in the Presets menu.
2. To reposition the M-mode cursor on the area of interest, roll the trackball.
3. Press the **SELECT** key.
The system reassigns trackball control to the pointer function.
4. Press the **PRIORITY TOOL** key to reassign trackball control to the imaging area on the screen.



System Reference

RESOURCES:

Ch 1



Basic System



Instructions for Use

Transmit Power	Ch 2
MI/TI Indices	Ch 2

Full Screen/Split Screen

To	Perform this action after activating 2D/M-mode	Shortcut
Initiate a full-screen M-mode sweep	Select the Imaging group box to access the screen format buttons. Select the Full Screen Trace button.	Double-click the UPDATE VIEW key.
Toggle a full-screen M-mode sweep with a full-screen 2D image	After you select the Full Screen Trace button or the Full Screen 2D button in the Imaging group box, press the UPDATE VIEW key.	Press the UPDATE VIEW key.
Restore a split-screen format	Select the Imaging group box to access the screen format buttons. Select the Split Screen button.	Double-click the UPDATE VIEW key.

M-Mode Formats

Use the system presets to select your preference of a 2D/M-mode imaging format. The available formats include:

- 1/2 2D, 1/2 trace
- 1/3 2D, 2/3 trace
- 2/3 2D, 1/3 trace
- Side by side



Basic System

Optimizing 2D- and M-Mode Images

The system provides a variety of settings that allow you to optimize 2D- and M-mode images. Some settings are changed using controls on the control panel, including depth, gain, depth gain compensation, focus, zoom, and field of view. Others are adjusted using mode-dependent Parameter menus and group boxes.

2D- and M-Mode Parameter Menus

Parameter menus for each imaging mode contain selections for you to optimize the image or the sweep.



System Reference

IMAGE:
Cadence Contrast
Agent Imaging Ch 9

2D-Mode Imaging Parameters

Menu Selection	Description
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer in 2D-mode.
# Foc (Number of Focal zones)	Selects the number of focal zones.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
R/S (Resolution/Speed)	Adjusts the balance between the image line density (resolution) and the frame rate.
Edge (Edge Enhancement)	Distinguishes the contours of a structure during real-time imaging.
Persist (Persistence)	Increasing Persistence creates a visible smoothing effect by maintaining lines of image data for each frame of imaging.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.
Tint	Changes the color of the image.
SieClear	Activates/deactivates the SieClear™ multi-view spatial compounding feature. SieClear is an optional feature.
TEQ Set	Saves a TEQ technology (Tissue Equalization) gain offset for the current 2D-mode imaging feature. TEQ is an optional feature.
Timer	For systems installed with the Cadence™ Contrast Agent Imaging (CCAI) option: Activates or deactivates the on-screen Timer. The Timer displays the time elapsed since the timer was started and records the value on frames saved to the CINE buffer.
Trig (Trigger)	For systems installed with the CCAI option: When enabled, limits the frame rate to the selected maximum value. Note: This selection is not available during Doppler or M-mode imaging.
Imaging Technique	Sets the imaging technique used during CCAI imaging: Agent Emission Imaging (High MI) Ensemble Contrast Imaging (Low MI)
Burst FR	For systems installed with the CCAI option: Sets the frame rate to be used during the Burst process. The frame rate determines the duration of the Burst process.
Start Burst	Initiates the Burst process during CCAI imaging. Note: After the Burst process completes (that is, when the number of frames set in Burst FR have occurred), the system automatically activates ECI-Low MI .

M-Mode Imaging Parameters

Menu Selection	Description
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer in M-mode.
Sweep Speed	Adjusts the scrolling speed of the M-mode sweep.
DR (Dynamic Range)	Adjusts the overall contrast resolution of the M-mode sweep.
Edge (Edge Enhancement)	Distinguishes the contours of a structure during real-time imaging.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.
Tint	Changes the color of the image.

Changing Transmit Frequency

Transmit Frequency changes the frequency of an active multi-frequency transducer in 2D- and M-modes. Selecting a higher frequency typically increases resolution, whereas selecting a lower frequency improves penetration.

Note: During 2D-mode and during M-mode, you can also use the **UNIVERSAL 1** control to adjust the transmit frequency.



System Reference

IMAGE:	
TEQ	2-10
Doppler	
Frequency	Ch 4
Color Frequency	Ch 3

To change the transducer frequency:

1. Select **0.00 MHz** from the 2D-mode or M-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the transmit frequency; rotate the control counterclockwise to decrease the transmit frequency.
3. Press the **MENU** control to confirm the setting and disengage the control.

Changing the Imaging Depth

Maximum and minimum depth selections are dependent upon the frequency of the transducer you are currently using. Depth is adjustable in 0.5 or 1 cm increments. The **DEPTH** control is located on the control panel.

The imaging depth displays at the bottom right of the image screen. When viewing modes with more than one image, the depth setting displays only for the active image.



DEPTH control.

To change the imaging depth:

- Push down on the **DEPTH** control to increase the depth; push up on the control to decrease the depth. Repeat to adjust in 0.5 or 1 cm increments.

Optimizing the Overall FOV Image Brightness Uniformity (TEQ)

The TEQ technology (Tissue Equalization) optional feature automatically optimizes the overall field of view (FOV) image brightness uniformity by changing the DGC, overall gain, and lateral gain. The following menu selections are associated with TEQ:

- The **Tissue Equalization Refresh** button in the **Imaging** group box optimizes the DGC, overall gain, and lateral gain. This button is available when another function is assigned to the **UPDATE VIEW** key; for example, when the **UPDATE VIEW** key is being used to toggle images in Dual screen format. If this selection is not available, you can use the **UPDATE VIEW** key to activate TEQ.
- The **TEQ Set** menu selection located on the 2D-mode Parameter menu saves a TEQ gain offset (preferred image brightness after TEQ activation) for subsequent optimizations (for the current patient, exam type, and transducer). The TEQ gain offset represents the increments of gain adjustment to be added to or subtracted from the default optimized gain. The **TEQ Set** menu selection becomes available when you change the overall gain while TEQ is active.

Activating and Exiting TEQ

Note: TEQ is not available during SieScape acquisition, 3-Scape Imaging, or Cadence Contrast Agent Imaging. TEQ is not available when the **DGC Control** preset is set to "Maximum Image Depth".

To activate TEQ when:	Do this...
The TEQ symbol (\cong) is displayed next to the UPDATE VIEW icon on the lower right of the screen.	Press the UPDATE VIEW key.
The TEQ symbol (\cong) is <i>not</i> displayed next to the UPDATE VIEW icon on the lower right of the screen (another function is assigned to the UPDATE VIEW key).	Select the Tissue Equalization Refresh button from the Imaging group box.

The system optimizes the DGC, overall gain, and lateral gain; updates the DGC curve and gain displayed on the screen; and displays the TEQ symbol (\cong) to the right of the 2D-mode indicator on the 2D-mode Parameter menu to indicate that TEQ is active.



Basic System



UPDATE VIEW key.



TEQ symbol
displayed next to the
UPDATE VIEW icon.

After the DGC and overall gain are optimized, this optimization remains in effect for the current patient unless you complete one of the following tasks:

- Optimize by refreshing (re-activating) TEQ
- Manually adjust the DGC or overall gain
- Freeze the image and then resume real-time imaging (when the corresponding refresh option is enabled in the system presets)
- Select another exam type or transducer
- Exit TEQ



Basic System 2

While TEQ is active, the DGC curve on the screen does not map to the positions of the DGC slider controls, although adjustment of the DGC slider controls causes the system to shift the optimized curve in the corresponding direction. If you activate a 2D-mode imaging feature that supports TEQ (such as THI), then the system automatically updates the optimization for that imaging feature.

To exit TEQ:

Note: If the **UPDATE VIEW** key is assigned to a function other than TEQ, then the system is either displaying multiple 2D images (in 2D mode, 2D/Doppler mode, or 2D/Doppler mode with color), or the system is using an imaging feature that does not support TEQ, such as SieScape or 3-Scape. You must exit the format display, imaging mode, or imaging feature before exiting TEQ.

- Press the **UPDATE VIEW** key twice in quick succession (double-click).

The system synchronizes the Depth-Gain Compensation (DGC) curve to the positions of the DGC slider controls and clears the lateral gain, but the system retains the overall gain setting last applied using TEQ. The system also removes the TEQ symbol from the screen to indicate that TEQ is no longer active.

Saving TEQ Gain Offsets for the Current Patient Examination

When TEQ is active, you can adjust the overall gain and then save this offset for subsequent optimizations (for the current patient, exam type, and transducer). Use the **2D** control on the control panel to adjust the overall gain. Use the **TEQ Set** menu selection located on the 2D-mode Parameter menu to save the TEQ gain offset.

The TEQ gain offset represents the increments of gain adjustment to be added to or subtracted from the optimized gain. You can save a separate TEQ gain offset for each 2D-mode imaging feature that supports TEQ. For example, you can save one TEQ gain offset for general 2D-mode imaging and another TEQ gain offset for Tissue Harmonic Imaging (THI).

To save a TEQ gain offset:

1. Activate TEQ using either the **UPDATE VIEW** key or the **Tissue Equalization Refresh** button from the **Imaging** group box.
2. Rotate the **2D** control to adjust the overall gain.
3. Select **TEQ Set** from the 2D-mode Parameter menu.

The system saves the TEQ gain offset for all subsequent optimizations during the current patient, exam type, and transducer.

To apply a saved TEQ gain offset:

- Activate TEQ using either the **UPDATE VIEW** key or the **Tissue Equalization Refresh** button from the **Imaging** group box.

The system optimizes the DGC and applies the saved TEQ gain offset to the active image.

Saving TEQ Gain Offsets for Later Patient Examinations

To save a TEQ gain offset for later studies or examinations, create a user-defined exam type. The TEQ gain offset represents the increments of gain adjustment to be added to or subtracted from the automatically optimized gain.

Note: A user-defined exam type retains all TEQ gain offsets. For example, after saving a TEQ gain offset for general 2D-mode imaging and another TEQ gain offset for Tissue Harmonic Imaging (THI), you create a user-defined exam type. The next time you retrieve this exam type (and activate TEQ and the applicable 2D-mode imaging feature), the system applies the relevant TEQ gain offset.

When you create a user-defined exam type containing one or more TEQ gain offsets, you can designate either the default overall gain or an adjusted overall gain for use when 2D-mode imaging is active but TEQ is not active.



System Reference

User-Defined Exam Type	2-27
------------------------	------

To create a user-defined exam type containing TEQ gain offset(s) and using the default overall gain:

1. Note the value of the initial (default) overall gain. Do not adjust the overall gain.
2. Save the required TEQ gain offsets.
3. Exit TEQ.
4. Adjust overall gain to the default value noted in step 1.
5. While TEQ is not active, create (save) the user-defined exam type.

To create a user-defined exam type containing an adjusted overall gain in addition to the TEQ gain offset(s):

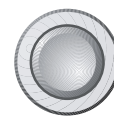
1. Ensure that TEQ is not active.
2. Adjust overall gain as required for general 2D-mode imaging (when TEQ is not active).
3. Create the user-defined exam type while TEQ is not active.
The system saves and activates the user-defined exam type with your adjusted overall gain. The name of the activated exam type is displayed in the **Exam Type** selection of the Parameter menu on the **Image** task card.
4. Save the required TEQ gain offsets.
5. Exit TEQ.
6. Adjust overall gain as required for general 2D-mode imaging (when TEQ is not active).
7. Save changes to the user-defined exam type while TEQ is not active.
The system saves the TEQ gain offset(s) to the user-defined exam type.

Adjusting the Overall Gain

Gain adjusts the echo amplification and brightness of a 2D image and M-mode sweep. The range for gain is -20 dB to 60 dB in 1 dB increments.

When viewing Dual- or Seamless Dual-format with more than one image, the setting displays only for the active image. The **Gain** value displays next to the active imaging mode on the Parameter menu.

Note: TEQ technology (Tissue Equalization) automatically optimizes the overall FOV image brightness uniformity. To activate TEQ, press the **UPDATE VIEW** key or select the **Tissue Equalization Refresh** button from the **Imaging** group box. TEQ is an optional feature.



2D

Gain setting.

To adjust the overall gain for 2D-mode:

- Rotate the **2D** control clockwise to increase the gain; rotate the control counterclockwise to decrease the gain.

To adjust the overall gain for M-mode:

- Rotate the **M** control clockwise to increase the gain; rotate the control counterclockwise to decrease the gain.

Adjusting the Depth Gain Compensation (DGC)

DGC (Depth Gain Compensation) compensates for weak signals or over bright signals at various depths. Overall image brightness is adjusted using the **2D** control.

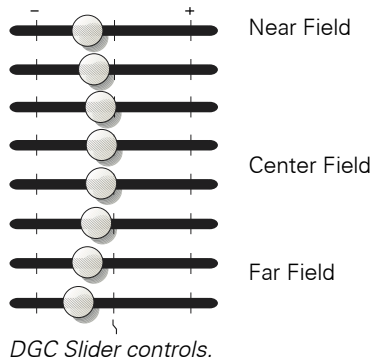
Note: TEQ technology (Tissue Equalization) automatically optimizes the overall FOV image brightness uniformity. To activate TEQ, press the **UPDATE VIEW** key or select the **Tissue Equalization Refresh** button from the **Imaging** group box. TEQ is an optional feature.



System Reference

IMAGE:	
TEQ	2-10
RESOURCES:	
System Presets	Ch 1

The **DGC** provides eight slider controls for adjusting image quality during real-time imaging.



Use the system presets menu to activate the display of the DGC curve. The curve provides an on-screen representation of the DGC settings.

In 2D/M-mode, DGC adjustments affect both the 2D-mode image and the M-mode sweep.

The DGC slider controls have no effect during CINE.



Basic System

To compensate for weak signals or overly bright signals:

- Position a **DGC** slider control to the right to increase a setting; position the control to the left to decrease a setting.

To adjust image brightness:

- Rotate the **2D** control clockwise to increase the brightness; rotate the control counterclockwise to decrease the brightness.

Changing the Dynamic Range

Dynamic Range controls the overall contrast resolution of the 2D-mode image or the M-mode sweep. Dynamic Range values are from 30 dB to 70 dB in 5 dB increments.

In Dual- or Seamless Dual-format with more than one image, the setting displays only for the active image.

To change the dynamic range for 2D-mode or M-mode:

1. Select **Dynamic Range** from the 2D-mode or M-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the Dynamic Range; rotate the control counterclockwise to decrease the Dynamic Range.
3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

IMAGE:

Example Screen
Layout

Ch 1

Selecting Focal Zones

Curved array and linear array transducers support multiple transmit focus zones, which you can select in 2D-mode images. Focal zone markers display on the right side of the image screen.

In Dual- and Seamless Dual-formats, when the focal zones and positions are changed in one image, they are also changed in the other image. However, the change does not take effect until the next time the other image is activated. During M-mode, Doppler, or Color, only one focal zone is available. In Doppler, the focal zone is always at the position of the Doppler gate. During Color, the focal zone is always at the center of the Color ROI.

Note: During 2D-mode imaging, you can also use the **UNIVERSAL 2** control to change this parameter.

To select the number of focal zones:

1. Select **#Foc** from the 2D-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the number of focal zones; rotate the control counterclockwise to decrease the number of focal zones.
3. Press the **MENU** control to confirm the setting and disengage the control.

Positioning Focal Zone Markers

You can change the location of the focal zone markers for curved array and linear array and phased array transducers.

To relocate the focal zone markers:

- Push up on the **FOCUS** control to raise the marker(s); push down on the control to lower the marker(s).

Single Focal Zone

When you select one (1) focal zone, push up or push down on the **FOCUS** control to reposition the focal zone marker, regardless of scan depth.

Multiple Focal Zones

When you select two or more focal zone markers, the spacing between the focal zones adjusts automatically. Pushing the **FOCUS** control up or down adjusts the relative position of the focal zone markers within the field of view. Available positioning depends upon your selected depth.

Using multiple focal zone markers causes a reduction in the frame rate. The amount of frame rate reduction depends on the depth of view and transducer.

Changing the Resolution/Speed

You can increase or decrease the number of acoustic scan lines per frame for 2D images. Increasing the line density improves image detail and decreases the frame rate. Frame rate is also dependent on the scan angle or image width and the imaging depth.

The frames per second displays above the **R/S** parameter. The values range from **0** to **5**.

To change the Resolution/Speed setting:

1. Select **R/S** from the 2D-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the resolution/speed; rotate the control counterclockwise to decrease the resolution/speed.
3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

Field of View	2-22
Depth	2-9

Changing the Persistence

Persistence provides a visible smoothing effect to the 2D-mode image by persisting lines of image data for each frame of imaging.

There are five available settings.

Setting	Description
0	Off. All lines of data for each frame are new
1	At minimum persistence value, only a small percentage of image data is a mix from previous frames.
2	As the persistence value increases, a larger percentage of data from previous frames is included in the image data.
3	As the persistence value increases, a larger percentage of data from previous frames is included in the image data.
4	At maximum persistence value, the majority of image data is a mix from previous frames.

To change Persistence:

1. Select **Persist** from the 2D-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the persistence; rotate the control counterclockwise to decrease the persistence.
3. Press the **MENU** control to confirm the setting and disengage the control.

Selecting a Gray Map

The **Map** parameter is used to select a processing curve that assigns echo amplitudes to gray levels. **Map** can be activated during real-time imaging or when the system is in freeze.

The active gray map is depicted by a gray bar, which displays on the right side of the image screen. The gray bar represents the range of gray shades available for the selected map.

To select a Gray Map:

1. Select **Map** from the 2D-mode or M-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the gray map setting; rotate the control counterclockwise to decrease the gray map setting.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting the Tint

The **Tint** parameter changes the color of the image by adding more blue, red, yellow, or green to the gray in a gray map. Tint values range from 0 to 11.

To adjust the tint:

1. Select **Tint** from the 2D-mode or M-mode Parameter menu.
2. Rotate the **MENU** control clockwise or counterclockwise to change the tint.
3. Press the **MENU** control to confirm the setting and disengage the control.

Changing the Edge Enhancement

Edge enhancement helps you distinguish the contours of a structure during real-time imaging. Edge enhancement values range from **0** (none) to **3** (maximum).

The edge enhancement setting displays on the Parameter menu. In Dual- or Seamless Dual-format, the setting displays only for the active image. In 2D/M-mode, the setting displays only for the active mode.

To enhance the edges of a real-time image:

1. Select **Edge** from the 2D-mode or M-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase edge enhancement; rotate the control counterclockwise to decrease edge enhancement.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting the M-Mode Sweep Speed

Sweep allows you to adjust the scrolling speed of the M-mode sweep. Select from five sweep speeds: **1**, **2**, **4**, **6**, and **8**.

Note: During M-mode, you can also use the **UNIVERSAL 2** control to change this parameter.

To adjust the scrolling speed of the M-mode sweep:

1. Select **Sweep** from the M-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the sweep speed; rotate the control counterclockwise to decrease the sweep speed.
3. Press the **MENU** control to confirm the setting and disengage the control.

Displaying Time Markers

Time markers display on the M-mode sweep. They do not scroll with the sweep.

Adjusting the Field of View

You can optimize the **field of view** (FOV) for curved array transducers during real-time imaging in 2D-mode by adjusting the sector angle and the position of the image. Steering is available for linear transducers.

The actual angle of the field of view is determined by the geometry of the transducer.

To adjust the FOV:

1. If the trackball is assigned to the pointer function in the Parameter menu, then press the **SELECT** key so you can change the assignment of the trackball to a tool on the image area of the screen.
2. Press the **PRIORITY TOOL** key to activate the FOV markers.
The system outlines the FOV with green dots.
3. Roll the trackball to the right to increase the FOV; roll the trackball to the left to decrease the FOV.
4. To reposition the FOV, press the **NEXT** key and roll the trackball to the right or left.
5. Press the **SELECT** key to assign trackball control to the pointer function.

To steer the FOV for a linear transducer:

1. If the trackball is assigned to the pointer function in the Parameter menu, then press the **SELECT** key so you can change the assignment of the trackball to a tool on the image area of the screen.
2. Press the **PRIORITY TOOL** key to activate the FOV markers.
The system outlines the FOV with green dots.
3. Roll the trackball to steer the FOV.
4. Press the **SELECT** key to assign trackball control to the pointer function.

Magnifying the Image

The **ZOOM** control allows you to magnify real-time or frozen 2D-mode images. The region of interest (ROI) can be adjusted and repositioned.

You can perform the following actions using Zoom.

To	Perform this action
To activate the zoom window	Press the ZOOM control.
Change the size of the zoom window and/or change the size of the magnified area	Rotate the ZOOM control. Clockwise to decrease; counterclockwise to increase.
Position the zoom window	Roll the trackball, then press the ZOOM control to magnify.
Cancel zoom and remove the window from the active image	Press the ZOOM control again.

The system indicates that the Zoom function is active by placing a **Z** on the lower, left side of the image screen.

Magnifying a Dual Image

When using Zoom in a Dual image, it is possible to apply the function to one or all of the images. Magnifying the first image causes the system to apply Zoom to subsequent Dual images. You can remove Zoom when the image is active.



To magnify a Dual image:

1. Press the **ZOOM** control.
The zoom window displays in the active image.
2. Roll the trackball to position the zoom window over the region of interest.
3. Rotate the **ZOOM** control clockwise to increase the magnification; rotate the control counterclockwise to decrease the magnification.
4. Press the **ZOOM** control.
The system magnifies the contents of the zoom window.
5. Press the **UPDATE VIEW** key to generate the second image.
The system freezes the first image and applies Zoom to the second image.
6. Press the **ZOOM** key to display the active image with normal magnification in the selected image.

Changing the Image Orientation

The system allows you to change the scan direction of a transducer, to horizontally flip a 2D-mode image, or vertically flip a 2D-mode image or M-mode sweep.

You can change the image orientation using the format options in the **Imaging** group box.

Icon	Format
	L/R Flip (Changes the scan direction of the active transducer. The image can be acquired from right-to-left or left-to-right.)
	U/D Flip (Changes the vertical orientation of the image on the screen. The image can display with the near field at the top or at the bottom of the screen.)

To change the orientation of an image:

1. When 2D-mode is the priority mode, select the **Imaging** group box.
2. Select the desired orientation button (**L/R Flip**, **U/D Flip**).

The system changes the image orientation. Placement of the transducer orientation indicator indicates the scan direction.

In Dual and Seamless Dual format, the system simultaneously rotates both the images.

Ensemble Tissue Harmonic Imaging

Ensemble™ Tissue Harmonic Imaging (THI) is a system feature that can enhance contrast resolution with fine tissue differentiation, benefiting difficult-to-image patients.

THI creates 2D-mode images from the received signals using the harmonics of the transmitted (fundamental) frequency. Harmonics are multiples of the fundamental frequency. The system utilizes the harmonics produced in tissue by the non-linear propagation of an ultrasound wave. A pulse sequence technique is used to remove the fundamental signals without affecting the harmonic signals. The harmonic signals have a narrower main lobe and lower side lobes than fundamental 2D-mode signals, resulting in improved spatial and contrast resolution.

To activate THI:

1. Rotate the **2D** secondary mode control (outer ring) to activate THI imaging.

The system indicates the THI feature is active on the 2D-mode Parameter menu next to the 2D status icon.

2. To exit THI, rotate the **2D** secondary mode control (outer ring) to reactivate 2D-mode imaging.

SieClear Multi-View Spatial Compounding

SieClear™ multi-view spatial compounding is an optional feature that can decrease speckle in a 2D-mode image, resulting in a clear view of image structures. Reduced speckle allows low contrast lesions to stand out and boundaries to appear more continuous.

Note: SieClear is not available during Cadence Contrast Agent Imaging.

SieClear multi-view spatial compounding involves the acquisition of echoes at a given point in an image using multiple different apertures, to decrease speckle. These echoes are then combined by averaging or by using a nonlinear process such as choosing the maximum intensity. The speckle from the different apertures are uncorrelated, so the compounded image has less variance in the speckle brightness than the uncompounded image.

The range of settings when SieClear is enabled is from 1 (lowest) to 4 (highest). Higher settings use more compounding (more smoothing).

To activate SieClear:

1. Select **SieClear** from the 2D-mode Parameter menu.
2. Rotate the **MENU** control to select the required setting.
3. To exit SieClear, select **SieClear** from the 2D-mode Parameter menu and then rotate the **MENU** control in the counterclockwise direction until the **Off** selection displays.

User-Defined Exam Type

The User-Defined exam type feature allows you capture an optimized configuration of imaging parameter settings for a specific transducer and exam.



System Reference

TEQ gain offsets 2-12

Creating a User-Defined Exam Type

You can have a maximum of 10 User-Defined exam types on the system at one time. If you attempt to create a new User-Defined exam type, or load a saved User-Defined exam type from disk after the maximum is reached, the system will require you to delete one or more existing User-Defined exam type to accommodate the new ones.

To create a User-Defined exam type:

1. Access the **Exam** type drop-down menu and select an exam type or use the study type selected in the **Patient Registration** form.
2. Select a transducer and adjust the imaging parameters by operating mode.
3. Access the **Exam** type drop-down menu again and select **User-Defined** from the bottom of the list.

The system displays the **User-Defined** dialog box.

4. Use the keyboard to enter a name for your exam type.
5. Select **OK** to save the user-defined exam type and close the dialog box.
6. If you do not want to save the exam type, select **CANCEL**.

To delete or rename an existing User-Defined exam type:

1. Access the **Exam** type drop-down menu and select **User-Defined**.

The system displays the **User-Defined** dialog box.

2. Select **DELETE** or enter in a new name and select **OK**.

Activating a User-Defined exam type:

- Select user-defined exam type from the **Exam** type menu.

3 Color Flow Imaging

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Activating Color Flow Imaging and Power Mode

During Color Flow imaging, the system applies color to a defined **region of interest** (ROI) within the 2D image. The system measures and assigns specific color to the velocities of blood flow within the ROI. You can adjust the depth, location, and size of the ROI, as well as the parameters that affect color imaging performance. Color Flow imaging is supported by all imaging transducers.

Power mode detects and assigns color to the energy generated by the reflections of blood flow. You can use Power mode with any transducer that supports Color Flow imaging. Power mode has the same parameter menu selections as Color Flow imaging with the following exceptions:

- You cannot adjust the Baseline for Power mode.
- You cannot Invert the Power bar

Follow the Color Flow instructions for Power mode.

When Color or Power is the priority mode:

- The Parameter menu lists Color or Power selections.
- The system assigns control of the trackball to the positioning, sizing, and steering of the ROI.
- The **UNIVERSAL 1** control is assigned to **PRF**, and the **UNIVERSAL 2** control is assigned to **Flow State**.

To activate Color or Power mode:

Once you power on the system and activate either Color Flow imaging or Power mode, the system remembers which of the two modes was used last and activates this mode when you press the **C** control.

1. Press the **C** control on the control panel to display either Color Flow imaging or Power mode.
2. If the mode you want is not displayed, rotate the **C** secondary mode control (outer ring). Rotate the control clockwise to display power; rotate the control counterclockwise to display color.

The system places the ROI, outlined in solid green, on the image.

3. To reposition the ROI, roll the trackball.
4. To resize the ROI, press the **NEXT** key and roll the trackball.
The system outlines the ROI with a dotted green line with solid corners.
5. For linear array transducers, to steer the ROI, press the **NEXT** key and roll the trackball.

The system outlines the ROI with a dotted green line.

Note: Pressing the **NEXT** key cycles through **size**, **position**, and **steer** for linear array transducers and between **size** and **position** for curved array transducers.

6. To exit Color Flow imaging or Power mode, press the **C** control.



System Reference

ROI	3-7
Gain	3-8
PRF	3-12
Persist	3-11

Color Flow Imaging and Power Mode Combinations

These combinations are available:

- 2D-mode with Color or Power
- Zoomed 2D-mode with Color or Power
- Color or Power Dual or Seamless Dual (Color or Power in both images on the screen)
- 2D/Doppler with Color or Power
- Zoomed 2D/Doppler with Color or Power



System Reference

IMAGE:	
SieScape	Ch 8
3-Scape	Ch 10

Color Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Flow	Optimizes for velocity and resistance hemodynamic flow conditions.
Invert	Switches the colors depicting forward and reverse flow in the Color ROI and the color bar.
Priority (Tissue Reject)	Adjusts the threshold for choosing to display Color or 2D-mode data for any pixel.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Color.
Filter (Wall Filter)	Activates and deactivates the adaptive wall filter.
R/S	Adjusts the balance between the image line density (resolution) and the frame rate. Increasing the line density increases resolution and decreases frame rate.
Baseline %	Adjusts the relative baseline position upward and downward. A shift in the baseline adjusts the range of displayed flow velocities without changing the system PRF.
Persist (Persistence)	Determines how long the colors corresponding to blood flow velocity remain in the Color ROI before decaying or being replaced by another color.
Smooth (Smoothing)	Adjusts the level of spatial (both axial and lateral) averaging used to smooth the flow pattern display.
Maps	Selects a processing curve that assigns the velocity range to a range of colors.
Display (Display Color)	Activates and deactivates the Color information in the ROI. The default setting is to display Color.

Power Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Flow	Optimizes for velocity and resistance hemodynamic flow conditions.
Background	Activates a background enhancement of solid color. The solid background color changes, depending on the power map selected.
Priority (Tissue Reject)	Adjusts the threshold for the amplitude of the Power display.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Power mode.
Filter (Wall Filter)	Balances low flow sensitivity with flash suppression.
R/S	Adjusts the balance between the image line density (resolution) and the frame rate. Increasing the line density increases resolution and decreases frame rate.
Persist (Persistence)	Adjusts the time over which power data are processed in calculating the power amplitude display.
Smooth (Smoothing)	Adjusts the level of spatial (both axial and lateral) averaging used to smooth the flow pattern display.
Maps	Selects a processing curve that assigns flow amplitudes to color levels.
Display (Display Power)	Activates and deactivates the Power information in the ROI. The default setting is to display Power.

Updating an image

Toggle a Color or Power image with a Doppler spectrum to update either the 2D image or the Doppler spectrum.



System Reference

IMAGE:

Update Function Ch 2

RESOURCES:

System Presets Ch 1

Triplex (Live) Format

Synchronize the Doppler spectrum and a 2D-mode image with Color or a 2D-mode image with Power to display simultaneously in real-time.

Note: You can also select simultaneous (**live**) mode from the system Presets menu.

To enable a triplex format:

1. During Color Flow imaging or Power mode, display a real-time Doppler spectrum.
2. Select the desired settings from the Update menu in the Imaging group box.

Selecting a Flow State

Flow State optimizes the system for hemodynamic flow conditions.

The system automatically adjusts the parameters for wall filter and pulse repetition frequency (PRF) for the selected Flow State. The system has the following flow states:

- **Low** – allows maximum sensitivity to low velocity flows. The system achieves this by incorporating the lowest possible filter settings and lower PRFs. You may experience increased flash.
- **General** – provides superb color flow in 90 percent of exams. The general setting uses an adaptive wall filter to produce an optimal balance between flash (motion artifacts) suppression and maximum sensitivity.
- **High** – optimizes the system for the high arterial flow common to large pulsatile vessels and stenotic conditions.

Note: During Color Flow and Power imaging, you can also use the **UNIVERSAL 2** control to select a flow state.

To select a Flow State:

1. Select **Flow** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the flow state; rotate the control counterclockwise to decrease the flow state.
3. Press the **MENU** control to confirm the setting and disengage the control.

Positioning, Sizing, and Steering the ROI

The location and shape of the ROI depend on the active transducer and default imaging depth. When the size or position of the ROI is changed, the color information momentarily disappears. The ROI is outlined with a solid green line that denotes that the position of the ROI can be changed. A dotted green line with solid corners denotes that the size can be changed, and a dotted green line denotes that the ROI can be steered.

Note: Increasing the width of the ROI decreases the frame rate. Increasing the depth of the ROI may also decrease the frame rate.

To change the position of the Color ROI:

1. During real-time Color or Power imaging, press the **C** control to activate Color Flow imaging or Power mode. To change the mode from Color to Power or from Power to Color, rotate the **C** secondary mode control (outer ring).

The system outlines the ROI with a solid green line.

2. Roll the trackball to reposition the ROI.

To adjust the size of the Color or Power ROI:

1. During real-time Color or Power imaging, press the **PRIORITY TOOL** key to assign the trackball to the Color or Power ROI.

The system displays **C ROI** next to the Tool icon on the lower right of the screen and outlines the ROI with a dotted green line with solid corners.

2. Press the **NEXT** key to select the **Size** tool function. The **NEXT** key toggles the **size** and **position** tool function for curved array transducers.

The system outlines the ROI with a dotted green line with solid corners.

3. Roll the trackball to change the size of the ROI.

To	Roll the trackball
Lengthen the window	Down
Shorten the window	Up
Widen the window	Right
Narrow the window	Left

Note: You can expand the ROI to entirely cover the 2D field of view. This is useful during Power mode imaging.

For linear array transducers, to steer the Color or Power ROI:

1. During real-time Color or Power imaging, press the **PRIORITY TOOL** key to cycle the screen tool to the Color or Power ROI.
2. Press the **NEXT** key to select the **Steer** tool function. The **NEXT** key cycles through the **size**, **position**, and **steer** tool functions for linear array transducers.

The system outlines the ROI with a dotted green line.

3. Roll the trackball to steer the ROI.

Note: Pressing the **NEXT** key cycles through **size**, **position**, and **steer** for linear array transducers and between **size** and **position** for curved array transducers.

Adjusting the Color Gain or Power Gain

Rotate the **C** control on the control panel to adjust the receive gain for Color or Power without affecting the image gain. The adjustment range for Color gain is -20 to 20 db in 1-db increments. The adjustment range for Power gain is -20 to 20 db in 1-db increments.

Adjust the Color gain before adjusting color parameters. Set the gain level so that random pixels of color appear outside of the vessel of interest, then reduce the gain until random noise disappears.

The Color gain value displays on the Color or Power Parameter menu.

To adjust the gain for Color Flow imaging or Power mode:

- Rotate the **C** control clockwise to increase the gain; rotate the control counterclockwise to decrease the gain.

Adjusting the Wall Filter

Filter selects a level of motion discrimination during real-time imaging. The range of settings is from **0** to **3**. Higher settings suppress flash (motion artifacts) and reduce system sensitivity to detect low velocity flow. Lower settings provide better sensitivity to lower velocities and small vessel detection, and increase the probability of displaying flash.

To adjust the filter:

1. Select **Filter** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the filtering; rotate the control counterclockwise to decrease the filtering.
3. Press the **MENU** control to confirm the setting and disengage the control.

Changing the Transmit Frequency

Transmit Frequency changes the operating frequency of an active transducer. Selecting a higher frequency typically increases resolution, whereas selecting a lower frequency improves penetration.



Instructions for Use

Transmit Power Ch 2

To change the transmit frequency:

1. Select **MHz** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the transmit frequency; rotate the control counterclockwise to decrease the transmit frequency.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting the 2D Field of View with Color or Power

You can optimize the **field of view** (FOV) for curved array transducers during real-time imaging in 2D-mode by adjusting the sector angle and the position of the image. Steering is available for linear transducers.

The Color or Power ROI is linked to the 2D **field of view** (FOV). You can narrow the FOV of the 2D image to equal the width of the Color or Power ROI. Narrowing the width of the 2D image to less than the width of the ROI also narrows the width of the ROI. However, widening the width of the 2D FOV does not widen the ROI. Repositioning the FOV also repositions the ROI.

To adjust the FOV:

1. If the trackball is assigned to the pointer function in the Parameter menu, then press the **SELECT** key so you can change the assignment of the trackball to a tool on the image area of the screen.
2. Press the **PRIORITY TOOL** key to activate the FOV markers.
The system outlines the FOV with green dots.
3. Roll the trackball to the right to increase the FOV; roll the trackball to the left to decrease the FOV.
4. To reposition the FOV, press the **NEXT** key and roll the trackball to the right or left.
5. Press the **SELECT** key to assign trackball control to the pointer function.

To steer the FOV for a linear transducer:

1. If the trackball is assigned to the pointer function in the Parameter menu, then press the **SELECT** key so you can change the assignment of the trackball to a tool on the image area of the screen.
2. Press the **PRIORITY TOOL** key to activate the FOV markers.
The system outlines the FOV with green dots.
3. Roll the trackball to steer the FOV.
4. Press the **SELECT** key to assign trackball control to the pointer function.

Adjusting the Color Baseline

Baseline adjusts aliasing in the flow direction under evaluation. Shifting the Baseline adjusts the range of displayed flow velocities without changing the Color PRF. If adjusting the baseline does not compensate for very high velocities and aliasing, increase the Color PRF to increase the velocity range.



System Reference

PRF

3-12

As the baseline is changed, the system updates the values displayed at both ends of the velocity color scale.

To shift the baseline:

1. Select **Baseline** from the Color Parameter menu.
2. Rotate the **MENU** control clockwise to shift the baseline upward and display a larger range of velocities below the baseline; rotate the control counterclockwise to shift the baseline downward and display a larger range of velocities above the baseline.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting Persistence

Color Persistence determines how long Color data remain in the ROI. Persisted color data remain on the screen until the persistence time has expired or the system detects a higher flow velocity.

Power Persistence adjusts the time over which power data are processed in calculating the power amplitude display. When power persistence is increased, a longer duration for calculations displays a smoother power image. When power persistence is decreased, a shorter duration for calculations displays a more pulsatile flow.

Increase persistence to increase the time a peak velocity is held.
Decrease Persistence to decrease the time a peak velocity is held.
The range of settings is from **0** to **4**.

To change persistence:

1. Select **Persist** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the time a peak velocity is held; rotate the control counterclockwise to decrease the time a peak velocity is held.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting the PRF (Velocity Range)

Pulsed Repetition Frequency (PRF) adjusts the color velocity range. You can also adjust the color velocity range using the color baseline. The velocity range is determined by the depth of the ROI and by the transmit frequency of the transducer. When the carrier frequency is downshifted, the velocity range increases.

You can adjust the PRF independently for each operating mode during mixed mode imaging. For example, the velocity range can be different for Color Flow imaging than for Doppler.

Note: During Color Flow and Power imaging, you can also use the **UNIVERSAL 1** control to adjust the PRF.

To change the PRF:

1. Select **PRF** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the PRF; rotate the control counterclockwise to decrease the PRF.
3. Press the **MENU** control to confirm the setting and disengage the control.

Changing the Line Density (Resolution/Speed)

Line Density increases or decreases the number of acoustic scan lines passing through the ROI. Increasing the line density increases resolution and decreases frame rate. The values range from **0** to **5**.

To change the Line Density setting:

1. Select **R/S** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the line density; rotate the control counterclockwise to decrease the line density.
3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

Baseline	3-11
Transmit Frequency	3-9
Update	Ch 3

Smoothing the Flow Pattern (Spatial Averaging)

Smoothing the flow pattern adjusts the level of spatial averaging (both axial and lateral) used to smooth the flow pattern display. As spatial averaging is increased, the flow sensitivity increases, but spatial resolution decreases. The range of settings is from **0** to **3**.

To smooth the flow pattern:

1. Select **Smooth** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the filtering; rotate the control counterclockwise to decrease the filtering.
3. Press the **MENU** control to confirm the setting and disengage the control.

Selecting a Color Map

A **Map** is the range of colors assigned to the Color or Power ROI. It is based on blood velocity for Color Flow imaging and flow amplitude for Power mode.

There are six maps for Color Flow imaging and six maps for Power mode. Three of the Color Flow maps indicate velocity and variance.

The active map is depicted by the Color or Power bar, which displays on the right side of the image screen. The bar represents the range of color shades available for the selected map.

For Color Flow imaging, changes in hue represent changes in velocity. Darker hues indicate lower velocities, and lighter hues indicate higher velocities. These maps also indicate flow direction by using shades of red and blue. Color Flow velocity and variance maps indicate blood flow turbulence by using shades of green.

Power maps indicate stronger signals in brighter colors and weaker signals in dimmer colors, according to flow amplitude.

To select a Map:

1. Select **Maps** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise or counterclockwise to change the map selection.

The velocity and variance maps are located at the end of the Color map selections.

3. Press the **MENU** control to confirm the setting and disengage the control.

0.22

0.22
cm/s

*Example of a Color Bar:
displays the velocity
range in
centimeters/second
(cm/s).*

Inverting the Color Scale

Note: Invert for Power mode is reserved for future use.

Invert the color scale to quickly adjust the color flow to the type of hemodynamics in the image.

To invert the color scale:

- Select **Invert on** from the Color Parameter menu.
The system inverts the colors depicting forward and reverse flow in the Color ROI and in the color bar.
- Select **Invert off** from the Color Parameter menu.
The system reverts to the original color assignment.



System Reference

ROI	3-7
Color Bar	3-13

Deactivating the Display

Display activates or deactivates the Color or Power display. The default setting is to display Color or Power. Use this parameter to show 2D anatomy in the ROI for real-time and frozen images.

To deactivate the display:

- Select **Display** from the Color or Power Parameter menu.
The display is deactivated.

Selecting a Priority Level

Color Priority adjusts the threshold for choosing whether to display Color or 2D-mode data for any pixel. An increase in color priority results in more color pixel information overlaying the 2D image.

Power Priority adjusts the threshold for the amplitude of the Power display. An increase in power priority results in more power information, since the range of signal amplitudes increases, including the weaker signals. A decrease in power priority decreases the weaker amplitude signals, and less power is displayed.

The priority levels range from **0** to **4**.

To adjust the priority level:

1. Select **Priority** from the Color or Power Parameter menu.
2. Rotate the **MENU** control clockwise to increase the priority; rotate the control counterclockwise to decrease the priority.
3. Press the **MENU** control to confirm the setting and disengage the control.

Power Background Display

Background activates a background enhancement of solid color. The solid background color changes, depending on the power map selected. As Power **Priority** is decreased, the background color fills in the areas where the weaker power signals previously existed.

To activate the background display:

- Select **Backgrd on** from the Color or Power Parameter menu.
The background display is activated.

4 Doppler Functions

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Activating Pulsed Doppler

System display in Doppler depends on cursor selection in the Doppler/M-mode Setup menu in system presets.

- **Cursor On** – If the cursor mode is set to **ON** in Doppler/M-mode Setup Options in system presets, the **Doppler cursor** displays on the 2D image when Pulsed Doppler is first activated. A **flow angle indicator** displays on the Doppler gate.

This cursor represents the acoustic line along which the sample volume or the **Doppler gate** is placed for gathering Doppler information.

- **Cursor Off** – If the cursor mode is set to **OFF**, the system simultaneously displays a 2D image and the Doppler spectrum when Pulsed Doppler is activated.

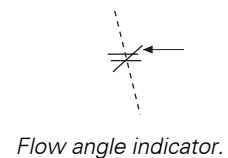
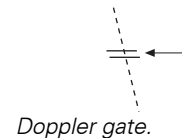
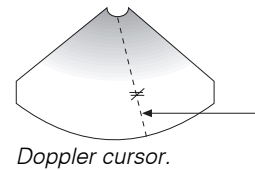
When Pulsed Doppler is the priority mode:

- The Parameter menu lists Doppler selections.
- The **Imaging** group box displays Update menu selections.
- The system assigns control of the trackball to the positioning and steering of the Doppler gate.
- The **UNIVERSAL 1** control is assigned to **PRF** (Pulse Repetition Frequency), and the **UNIVERSAL 2** control is assigned to **Baseline**.

Note: The Doppler signal is audible only when **Cursor Audio Mode** is activated from the system Presets menu.

To activate Doppler with Cursor ON:

1. Press the **D** control.
The system displays a Doppler gate on the 2D image.
2. Roll the trackball to position the Doppler gate on the area of interest.
The range of the Doppler gate size is dependent on the transmit frequency of the transducer.
3. Press the **D** control a second time.
The system displays the Doppler spectrum and the 2D image according to the format selected in the Presets menu.
4. Press the **SELECT** key.
The system reassigns trackball control to the pointer function.
5. Press the **PRIORITY TOOL** key to reassign trackball control to the imaging area on the screen.
6. Press the **FREEZE** key to freeze the Doppler spectrum.
A bright blue vertical bar indicates the position at which the spectrum was frozen.



Doppler/M-mode Setup

To activate Doppler with Cursor OFF:

1. Press the **D** control.
The system displays a Doppler gate on the 2D image and displays the Doppler spectrum according to the format selected in the **Presets** menu.
2. To reposition the Doppler gate on the area of interest, roll the trackball.
The range of the Doppler gate size is dependent on the transmit frequency of the transducer.
3. Press the **SELECT** key.
The system reassigns trackball control to the pointer function.
4. Press the **PRIORITY TOOL** key to reassign trackball control to the imaging area on the screen.
5. Press the **FREEZE** key to freeze the Doppler spectrum.
A bright blue vertical bar indicates the position at which the spectrum was frozen.

Full Screen/Split Screen

To	Perform this action after activating Pulsed Doppler	Shortcut
Initiate a full-screen Doppler spectrum	Select the Imaging group box to access the screen format buttons. Select the Full Screen Trace button.	Double-click the UPDATE VIEW key.
Toggle a full-screen Doppler spectrum with a full-screen 2D image	After you select the Full Screen Trace button or the Full Screen 2D button in the Imaging group box, press the UPDATE VIEW key.	Press the UPDATE VIEW key.
Restore a split-screen format	Select the Imaging group box to access the screen format buttons. Select the Split Screen button.	Double-click the UPDATE VIEW key.

2D/Doppler Formats

When Doppler is active, there are three screen format options:

- Full Screen Trace
- Split Screen
- Full Screen 2D

To select a Doppler screen format:

1. Access the Imaging group box to view the **Doppler Format** buttons.
2. Select a screen format: **Full Screen Trace**, **Split Screen**, or **Full Screen 2D**.

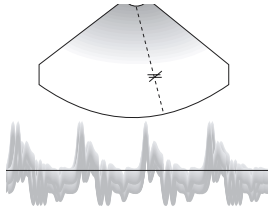
The system displays the split screen format according to the Doppler display preference selected in system presets.

Split Screen Format Options

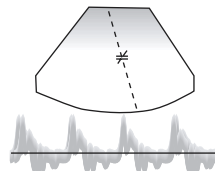
Use system presets to select your preference for split screen Doppler imaging formats. The available formats include:



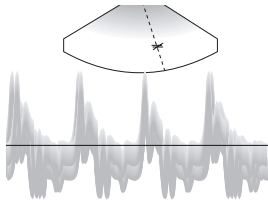
Doppler/M-mode Setup



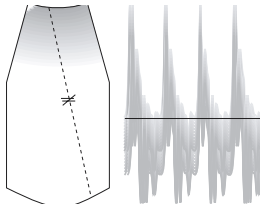
1/2 2D, 1/2 trace



2/3 2D, 1/3 trace



1/3 2D, 2/3 trace



Side by side

Update Function

You can display a real-time Doppler spectrum with a frozen 2D-mode image. Use the **UPDATE VIEW** key to toggle a real-time 2D image and a frozen spectrum with a frozen 2D image and real-time spectrum.

Note: The **Autostats On/Off** tool and **Above/Below Baseline** button are also located in the **Imaging** group box.

Update with 2D image Refresh

During update, the system pauses the Doppler spectrum and refreshes the 2D-mode image according to the interval defined using the Update menu selections. Available settings are:

- **2D-Lv/D-Lv**
- **2D-Lv/D-Frz**
- **D-Lv/2D-Frz**
- **D-Lv/2D-Lv**
- **2D-Lv/2D-EOS** (end of sweep)
- **2D-Lv/2D-2S** (every two seconds)
- **2D-Lv/2D-4S** (every four seconds)
- **2D-Lv/2D-8S** (every eight seconds)

To enable the refresh format or change the refresh interval:

- Select the refresh interval setting from the Update menu in the **Imaging** group box.

To toggle frozen and real-time images:

- Press the **UPDATE VIEW** key.

Simultaneous Format

You can synchronize the Doppler spectrum and 2D-mode image to display simultaneously in real-time.

To enable a simultaneous format:

- Select **2D-Lv/D-Lv** or **D-Lv/2D-Lv** from the Update menu in the **Imaging** group box.

Both the 2D-mode image and the Doppler spectrum display simultaneously in real-time.

Triplex Format

The system allows triplex format: Color mode and Power mode can be displayed simultaneously in real-time with 2D/Doppler.



System Reference

CALCS:	
Autostats On/Off	Ch 1
Above/Below	Ch 1
IMAGE:	
Color	Ch 3
Power	Ch 3

Activating Audio Mode

Cursor Audio Mode allows you to audibly interrogate vessels with Doppler in 2D-mode before displaying the Doppler spectrum. Use the system **Presets** menu to configure the system to initiate **Cursor Audio Mode** whenever the **D** control is pressed. When **Cursor Audio Mode** is active, the system displays a Doppler cursor in the 2D-mode image and displays 2D-mode selections on the Parameter menu.



Doppler/M-mode Setup

When the Doppler spectrum is inverted, the audio signal also inverts.

Note: Activating this function reduces the frame rate.

Optimizing the Doppler Spectrum

The Doppler spectrum is optimized using controls on the control panel or using mode-dependent Parameter menus.

When you change the setting of a control or parameter, the system highlights the corresponding on-screen value.



System Reference

RESOURCES:

System Presets Ch 1

Doppler Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Baseline	Shifts the spectral baseline position.
Invert	During pulsed wave, Doppler flips the Doppler spectrum vertically on the baseline and inverts the Doppler audio.
60/0/60 (Coarse Angle Correct)	Selects a sixty-degree or zero-degree Doppler angle for use by the system to calculate velocity.
Ang (Angle Correct)	Identifies the Doppler angle used by the system to calculate velocity and is an indicator to aid in obtaining an optimal Doppler angle. Adjusts the Doppler angle in degree increments.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Doppler.
Filter (Wall Filter)	Rejects low frequency signals, for example, signals generally caused by tissue clutter.
Gate (Gate Size)	Adjusts the size of the Doppler gate.
Sweep	Adjusts the horizontal speed of the Doppler spectrum.
Steer Rev. (Steer Reverse)	Reverses the Doppler angle, gate axis, and Doppler spectrum.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
Maps	Allows changes to the shape of the current Map.
Tint	Changes the color of the spectrum.
T/F Res (Time/Frequency Resolution)	Adjusts Time/Frequency resolution.

Positioning and Steering the Doppler Cursor

The **PRIORITY TOOL** key positions or *steers* the Doppler cursor in relation to the vessel or pathology of interest to obtain the desired angle of incidence. The amount of steering available is transducer-dependent.

Phased and Curved Array Transducers

Use the trackball to position the Doppler cursor throughout the field of view.

Linear Array Transducers

Steering is available only on linear array transducers.

To steer the Doppler cursor:

1. Select a linear array transducer from the transducer drop-down menu.
2. Press the **PRIORITY TOOL** key to activate the **Steer** tool.
3. Roll the trackball to the right or left to reposition the field of view.
4. Press the **SELECT** key to confirm the setting and disengage the control.

When using a linear array transducer, select **Steer Rev.** on the Doppler Parameter menu to quickly cycle through the center, left, and right positions.

Positioning the Doppler Gate

The *Doppler gate* displays on the Doppler cursor in the 2D image.

To position the Doppler gate:

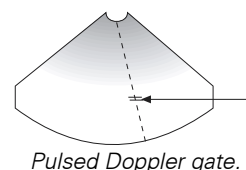
- Roll the trackball up or down to position the gate on the cursor.

Sizing the Doppler Gate

For Pulsed Doppler, *Gate Size* adjusts the size of the Doppler gate. Gate size ranges are dependent on the transmit frequency of the transducer.

To change the size of the Doppler gate:

1. Select **Size** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the gate size; rotate the control counterclockwise to decrease the gate size.
3. Press the **MENU** control to confirm the setting and disengage the control.



Indicating Flow Angle

The **flow angle indicator** indicates the degree of angle correction for the Doppler spectrum. Use the **ANG** (Angle Correct) parameter on the Doppler Parameter menu to adjust the flow angle indicator on the Doppler gate.

When you first activate Doppler, the display of the flow angle indicator to the Doppler cursor is exam-dependent.

Vascular studies	60° angle
All other exams	0° angle

Accurate Doppler shifts can be calculated for angles of 64° or less. The system indicates flow angles greater than 64° by highlighting the angle value.

To adjust the flow angle:

1. Select **ANG** on the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the angle; rotate the control counterclockwise to decrease the angle.
3. Press the **MENU** control to confirm the setting and disengage the control.

Selecting Time/Frequency Resolution

Time/Frequency adjusts the Time/Frequency resolution.

To select a Time/Frequency Resolution:

1. Select **T/F Res** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the time/frequency; counterclockwise to decrease the time/frequency.
3. Press the **MENU** control to confirm the setting and disengage the control.

Displaying the Velocity/Frequency Scale

You can select display of either the velocity (cm/s) or frequency (Hz) scale using the system presets.



Doppler/M-Mode Setup

Adjusting the Baseline

Baseline shifts the absolute perspective (zero velocity) for Doppler mode. When Doppler is the active mode, the **BASELINE** control adjusts the spectral Doppler baseline displayed on the trace.

There are 16 available positions for the baseline. When the baseline position has been changed, the scrolling spectrum restarts at the new position. On-screen frequency and velocity scales also update.

Note: You can also use the **UNIVERSAL 2** control to adjust this parameter.

To shift the baseline:

1. Select **Baseline** on the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to shift the baseline up; rotate the control counterclockwise to shift the baseline down.
3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting Doppler Gain

Adjust Doppler gain by rotating the **D** control. The Doppler gain controls the overall gain for Pulsed Doppler. The gain range is 0 dB to 90 dB in 1-dB increments.

To adjust gain for Doppler imaging:

- Rotate the **D** control clockwise to increase the gain; rotate the control counterclockwise to decrease the gain.

Changing the Transmit Frequency

Transmit Frequency adjusts the operating frequency of an active transducer. During mixed-mode imaging with Doppler, **Transmit Frequency** does not affect the 2D-mode frequency.

Selecting a higher frequency typically increases resolution, whereas selecting a lower frequency improves penetration.

To change the transmit frequency:

1. Select **0.00MHz** on the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the transducer frequency; rotate the control counterclockwise to decrease the transducer frequency.
3. Press the **MENU** control to confirm the setting and disengage the control.



Instructions for Use

Transmit Power Ch 2

Adjusting the Wall Filter

Wall Filter allows you to reject low frequency signals generally caused by tissue clutter. You can only change the wall filter during a real-time spectral sweep. The change affects the audio signal. Wall filter settings are dependent on the active transducer and exam type.

To change the wall filter:

- 1. Select **Filter** on the Doppler Parameter menu.
- 2. Rotate the **MENU** control clockwise to increase the wall filter; rotate the control counterclockwise to decrease the wall filter.
- 3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

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Update	4-6

Adjusting the PRF

PRF (Pulse Repetition Frequency) adjusts the Pulse Repetition scale.

Note: During Doppler, the **UNIVERSAL 1** control adjusts the PRF. Each time you push the **UNIVERSAL 1** control, the system restarts the spectrum at the new PRF setting and adjusts the scale.

To adjust the PRF:

- 1. Select **PRF** from the Doppler Parameter menu.
- 2. Rotate the **MENU** control clockwise to increase the PRF; rotate the control counterclockwise to decrease the PRF.
- 3. Press the **MENU** control to confirm the setting and disengage the control.

Adjusting the Sweep Speed

The **Sweep** parameter allows you to adjust the scrolling speed of the Doppler spectrum. Select from five sweep speeds: 1, 2, 4, 6, and 8.

To adjust the scrolling speed of the Doppler spectrum:

1. Select **Sweep** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the sweep speed; rotate the control counterclockwise to decrease the sweep speed.
3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

Audio Signal 4-3

Displaying Time Markers

Time markers display on the Doppler spectrum. The markers display in half second intervals in a fixed location on-screen. They do not scroll with the spectrum.

Inverting the Spectrum

Invert flips the spectral information vertically on the spectral baseline. The scale remains the same and the word **Invert** displays next to the frequency scale. When the Doppler spectrum flips vertically, Doppler audio also inverts.

To invert the spectrum:

1. Select **Invert** from the Doppler Parameter menu.
2. Press the **MENU** control.
The system flips the image and displays **Invert** next to the frequency scale.
3. Press the **MENU** control.
The system flips the image back to the original view and removes the Invert display.

Changing the Dynamic Range

Dynamic Range controls the overall contrast resolution of the Doppler spectrum. Dynamic Range values are from 30 dB to 70 dB in 5-dB increments.

To change the dynamic range for Doppler:

1. Select **DR** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the dynamic range; rotate the control counterclockwise to decrease the dynamic range.
3. Press the **MENU** control to confirm the setting and disengage the control.

Selecting a Gray Map

The **Map** parameter is used to select a processing curve that assigns echo amplitudes to gray levels. Map can be activated during real-time imaging or when the system is in freeze.

The active gray map is depicted by a gray bar, which displays on the right side of the image screen. The gray bar represents the range of gray shades available for the selected map.

To select a Gray Map:

1. Select **Map** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise to increase the gray map setting; rotate the control counterclockwise to decrease the gray map setting.
3. Press the **MENU** control to confirm the setting and disengage the control.

Colorizing the Doppler Spectrum

The **Tint** parameter changes the color of the Doppler spectrum by adding more blue, red, yellow, and green. Tint values range from 0 to 11.

To adjust the tint:

1. Select **Tint** from the Doppler Parameter menu.
2. Rotate the **MENU** control clockwise or counterclockwise to change the tint.
3. Press the **MENU** control to confirm the setting and disengage the control.



System Reference

RESOURCES:

Invert

4-13

5 CINE

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CINE

CINE continuously stores recently acquired data in a memory buffer in all imaging modes. Data stored in CINE memory is available for continuous playback or frame-by-frame review.

You can scroll through the images in recent memory and add measurements and annotations to any frame prior to printing. The CINE feature includes post-processing capabilities and data storage.



System Reference

Continuous	
Playback	5-6
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CINE Data Storage	5-8
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CINE Memory Buffer

CINE memory is fixed. However, the length of playback varies based on the complexity of the images. The simpler the image, the more images can be retained. Simple images (black and white, 2D) require less memory. The memory buffer fills faster during mix mode imaging with Doppler, Color, Power, or M-mode.

Unfreezing the system erases the data from the CINE memory buffer and restarts the acquisition of CINE data.

Resetting CINE Memory

The following actions delete all stored images from CINE memory:

- Unfreezing an image
- Changing an imaging mode
- Changing the transducer
- Changing the depth
- Changing ROI size
- Selecting a **New Patient** examination
- Powering off the system

CINE Graphics

During CINE playback, a **CINE bar** displays on-screen below the image. This CINE bar represents the status of the CINE memory buffer and contains the following elements:



Example of a CINE bar.

In Dual-modes, a CINE bar displays below each image.



System Reference

Editing the loop

5-7

- 1 **Left CINE marker** – Indicates the beginning of the CINE data. This marker can be repositioned to edit the length of the CINE data.
- 2 **Frame Counter** – Indicates the number of the active frame.
- 3 **Rate Indicator** – Indicates the rate of CINE playback. It can be set to 1, 2, 4, 1/8, 1/4, 1/3, 1/2, 2/3.
- 4 **Right CINE marker** – Indicates the end of the CINE data. This marker can be repositioned to edit the length of the CINE data.
- 5 **Frame Indicator** – Indicates the location of the frame within the loop of CINE data. It also indicates the direction the CINE data is moving for backward and forward review, and can be scrolled one frame at a time or continuously.

CINE Playback

The CINE memory buffer continuously accumulates data during real-time imaging. When CINE playback is activated, the accumulation process stops and the data in the memory buffer is available for replay, printing, or storage to a disk medium.

To activate CINE Playback:

1. Press the **FREEZE** key.

The system freezes the most recently acquired image. The CINE bar displays below the image. The Frame Indicator displays on the CINE bar at the location of the frozen image and the Frame Counter displays the frame number.

If selected in system presets, pressing the **FREEZE** key also displays the **Calcs** task card.
2. Rotate the **CINE** wheel.

Rotating the CINE wheel slowly moves the image one frame at a time. Spinning the wheel activates continuous motion.

As the wheel is rotated, the Frame Counter displays the current frame number.



Basic System

To exit CINE Playback:

- Press the **FREEZE** key to exit the CINE playback function and activate real-time imaging; or press an imaging mode control to activate real-time imaging.

Activating Frame Review

Frame Review provides access to any frame in the loop of CINE data. You can edit the beginning and ending positions of the loop.



System Reference

To review CINE data one frame at a time:

1. Activate CINE.
2. Rotate the CINE wheel to the left to review the most recent data; rotate the wheel to the right to review the oldest data.

The frame indicator indicates the direction of review and the location of the active frame. The Frame Counter updates with the number of the active frame.
3. To exit and clear the memory, press the **FREEZE** key.

The system activates real-time imaging.

Motion Review	5-6
CINE Store	5-8

Activating Continuous Playback

The CINE feature provides continuous playback of the loop of CINE data in a forward or backward direction.

Note: The signal of a Doppler spectrum is not audible when the playback rate has been adjusted.



System Reference

Frame Review	5-5
CINE Store	5-8

To playback CINE data in a continuous loop:

1. Activate CINE.
2. Spin the CINE wheel to the right to replay the CINE data in a forward direction; spin the wheel to the left to replay data in a backward direction.

The frame indicator scrolls continuously, indicating the direction of review and the location of the active frame. The Frame Counter updates with the number of the active frame.

3. To exit and clear the memory, press the **FREEZE** key.

The system activates real-time imaging.

Adjusting the Playback Rate

During continuous playback, increase or decrease the playback rate using the CINE **Rate Indicator** located on the bottom of the screen, to the right of the CINE bar. The available settings are: 1, 2, 4, 1/8, 1/4, 1/3, 1/2, and 2/3.

To adjust the playback rate:

- Use the trackball/**SELECT** key to click on the **Rate Indicator** until the desired rate is shown on the indicator.

The system updates the playback rate of the CINE data.

CINE Edit Function

You can change the beginning and ending CINE review positions within a loop of data. This edit function allows you to exclude frames from review of a specific segment. Exiting the CINE function will reset both positions.

To change beginning position:

1. Activate CINE.
2. Roll the trackball to position the cursor over the left CINE marker, and then press the **SELECT** key.
The left CINE marker highlights in green, indicating that it is active.
3. Roll the trackball to move the left CINE marker to the desired location on the loop of CINE data.
The new location of the left CINE marker indicates the edited starting position of the loop of CINE data.
4. Press the **SELECT** key to anchor the starting position.
The left CINE marker is anchored, and is no longer highlighted in green.
5. To review the edited CINE data, spin the **CINE** wheel for continuous motion or slowly rotate the wheel for frame-by-frame playback.



System Reference

Location of CINE marker	5-4
----------------------------	-----

To change the ending position:

Note: The end position for the CINE data cannot be moved ahead of the start position.

1. Activate CINE.
2. Roll the trackball to position the cursor over the right CINE marker, and then press the **SELECT** key.
The right CINE marker highlights in green, indicating that it is active.
3. Roll the trackball to move the right CINE marker to the desired location on the loop of CINE data.
The new location of the right CINE marker indicates the edited ending position of the loop of CINE data.
4. Press the **SELECT** key to anchor the ending position.
The right CINE marker is anchored, and is no longer highlighted in green.
5. To review the edited CINE data, spin the **CINE** wheel for continuous motion or slowly rotate the wheel for frame-by-frame playback.

CINE Data Storage

During review of CINE data, you can select and place CINE images into a variety of output media, including print, file, and VCR.

Storage Option	Description
VCR	Transfers an image to a VCR.
Clip/Vol Save	Reserved for future use.
Print/Store	Transfers image to the Review task card and preset destination, such as the hard disk or removable media. Use system presets to select the default storage destination.
Print/Store	Transfers image to a selected print device, such as a thermal printer. Use system presets to select the default print destination.

Saving a CINE Image to File

Color and black and white CINE images can be saved and reviewed in the **Review** task card. They can also be saved in both DICOM and TIFF image formats and stored on CD-R disks or on the network (DICOM). Each image stored to the CD-R disk or the network (DICOM) is duplicated on the hard disk for data safety.

To save a CINE image to file:

- Press the **PRINT/STORE** key on the control panel.
The image is transferred to the **Review** task card for review and is stored in the location selected in system presets.

Recording CINE Data

You can record data from CINE memory to a VCR connected to the ultrasound system. VCR controls are located in the VCR Group box below the Parameter menu in the **Image** task card, and the **VCR** key on the control panel toggles VCR recording on and off.

To transfer a CINE image to a VCR:

- Press the **VCR** key on the control panel.
The VCR begins recording. To stop recording, press the **VCR** key again.

Printing a CINE Image

You can transfer a CINE image to a print device that is selected in system presets.

To print an image:

- Press the **PRINT/STORE** key on the control panel.
The system transfers the image to the print device.

Image Magnification

Use the **ZOOM** control to magnify a single frame of data. You can also display images in CINE playback that were acquired while using the Zoom function, but the magnification cannot be reduced on those images.

CINE Post Processing

You can apply the following post-processing functions to CINE data in either frame playback or motion playback.

Imaging Mode	Post-Processing Options
2D	Zoom/pan
	Dynamic range
	Gray Map
	Tint
	Measurements
	Annotations
	Pictograms
Color	Zoom/pan
	Color map
	Color invert
	Color baseline shift
	Color display on/off
	Priority
	Measurements
	Annotations
Doppler	Pictograms
	Baseline shift
	Spectral dynamic range
	Gray map
	Tint
	Angle correct
	Spectral invert
	Measurements
M-Mode	Annotations
	Pictograms
	Dynamic range
	Gray map
	Tint
	Measurements
	Annotations
	Pictograms




System Reference


IMAGE:	
2D	Ch 2
Color	Ch 3
Doppler	Ch 4
M-mode	Ch 2
CALCS:	
Annotations	Ch 1
Pictograms	Ch 1

6 Biopsy

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 - Activating the On-screen Guidelines 3
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Biopsy (Puncture) Guideline Function

 **WARNING:** Percutaneous procedures always involve heightened risk to the patient and to the operator handling biopsy needle guides. Clinicians using Siemens recommended biopsy devices under ultrasound guidance should be trained and must observe proper needle insertion sequencing with the needle guide in order to avoid undue discomfort and unnecessary risk and injury to the patient.

 **WARNING:** The biopsy guidelines that display on the system monitor are not intended as an absolute reference. It is the user's responsibility to verify correct positioning of the needle during a biopsy or puncture procedure.

You can display on-screen guidelines for use with transducers compatible with needle guide attachments.

Activating the On-screen Guidelines

The biopsy function is activated only during real-time imaging in the following modes:

- 2D-mode full FOV
- 2D/Doppler
- 2D/M-mode
- 2D-mode with color
- 2D-mode with power
- 2D/Doppler with color
- 2D/Doppler with power

Should you attempt to activate the biopsy function from an incompatible mode, the system displays a message to indicate which corrective action the system will take to allow you to activate the biopsy function.

- Select **OK** to enter the biopsy function.
- Select **Cancel** to leave the system as it is. The system will not display the biopsy guidelines on the screen.

To activate the Guideline function:

1. During real-time imaging when the **Image** task card is active, access the **Imaging** group box on the left side of the screen.
2. Choose your needle path by selecting angle **A** or **B** under **Biopsy** in the **Imaging** group box. Your choice must correspond to the angle you selected for the needle guide. If the needle guide is a fixed-angle guide, select angle **A**.

The system displays the following message as a precaution:

Please verify that the physical needle guide matches your angle.

3. Use the trackball/**SELECT** key to select **OK** if you have verified that the needle guide angle matches your needle path. Use the trackball/**SELECT** key or press the **Enter** key on the keyboard to select **Cancel** to verify that the angle you selected matches your needle path.

Note: When the FOV depth range is less than 6 cm, the display of the biopsy guidelines change from dotted lines to dot-dash lines.

4. To remove the biopsy guidelines from the screen, select the angle again.



System Reference

IMAGE:	
Needle Path	
Verification	6-5

System Biopsy Safeguards

While using the biopsy function, you can switch to a different acceptable mode or freeze the image. When you freeze the image, the color of the guidelines change from yellow to white.

Should you request an action that is not allowed during the biopsy function, the system displays a message indicating that the action is not allowed. The message remains on the screen for a few seconds before it is removed.

Disconnecting the active transducer while in biopsy causes the system to exit the biopsy function. The system displays a message prompting you to connect a transducer and then it displays a message indicating that the biopsy function has ended.



System Reference

IMAGE:	
Activating	
On-screen	
Guidelines	6-3

Needle Path Verification


Before performing any patient procedure using a needle guide, you must verify that the path of the needle is accurately indicated by the on-screen guidelines.


The needle guide is ready for patient use ***only after the path of the needle has been verified.***

Checklist of Items Required for Needle Path Verification:

- ☐ Transducer with attached needle guide
- ☐ Water-based coupling agent (gel)
- ☐ Sterile transducer cover
- ☐ New, straight, biopsy needle
- ☐ Sterilized container of sterilized and degassed water

To verify the path of the needle:

 **WARNING:** The biopsy guidelines that display on the system monitor are not intended as an absolute reference. It is the user's responsibility to verify correct positioning of the needle during a biopsy or puncture procedure.

 **WARNING:** Do not use a needle guide if the path of the needle is not accurately indicated by the on-screen guidelines. The path of the needle must display within the guideline. Contact your Siemens service representative if the needle path is not accurately indicated.


1. Attach the needle guide to the transducer.
2. Connect the transducer to the system and activate the transducer.
3. Set the system to the depth of the intended puncture procedure.
4. Select the **A** or **B** icon under **Biopsy** in the **Imaging** group box on the **Image** task card to display the guidelines on the image screen. Ensure that the angle selected (**A** or **B**) corresponds to the needle guide attached to the transducer.
5. Immerse the head of the transducer into the degassed water and insert the needle into the needle guide.
6. Verify that the path of the needle displays according to the guidelines shown on the image screen.


After verification, the needle guide is ready for use.

7 Physio

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Physio Function

 **WARNING:** Use ECG for timing purposes only. It is not intended for diagnostic usage or patient monitoring.

 **WARNING:** Do not use the ECG feature in conjunction with electrosurgery or diathermy equipment.

The Physio module consists of the ECG feature.

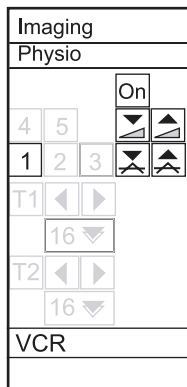
Note: The Physio module is optional on all SONOLINE Antares general imaging ultrasound systems.

The ECG feature includes three leads attached to a six-pin ECG cable, along with a start-up kit of ECG electrode patches.






The electrical activity controlling the heart muscle is detected by placing ECG electrode patches in specific locations on the patient and amplifying the electrical signals that produce the ECG trace display on the system monitor.

EMC NOTE: Operating the ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

Physio ■ Control Layout



Example of the **Physio** group box.

Selection	Description
 (On/Off)	Removes the physio trace from the screen or reactivates it.
 (Decrease Gain)	Decreases the wave amplitude of the trace.
 (Increase Gain)	Increases the wave amplitude of the trace.
 (Position Down)	Adjusts the trace downwards.
 (Position Up)	Adjusts the trace upwards.

Activating the ECG Feature

⚠ WARNING: To reduce risk of electric shock and burns, use only the cable and patient leads supplied with the ECG feature. Use of other ECG cables could defeat the current-limiting and electrical safety features of the ECG.

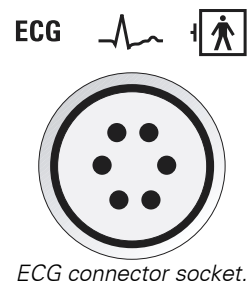
⚠ Caution: To avoid possible damage to the ECG cable, do not pull on the cable when disconnecting the ECG connector. Always grasp the connector housing.

Note: The ECG inputs are defibrillation proof. However, in the event of defibrillation while using the ECG function, the ECG inputs may become saturated (overloaded). An ECG pattern may not be visible for up to 30 seconds. After this time, the ECG function should return to normal operation.

Activating the ECG function consists of connecting the cable to the system and connecting the leads to the patient. The ECG trace is then activated when you connect the ECG cable to the socket labeled "ECG" on the left front of the system.

To activate ECG:

- Connect the six-pin ECG cable to the socket labeled ECG on the left front of the system.



Connecting Leads to the Patient

In keeping with existing international standards, the ECG leads for systems that operate at 115V (for example, North and South America) are red, white, and black. They are labeled RA (right arm), LA (left arm), and LL (left leg). Leads for systems that operate at 230V (for example, Europe) are green, red, and yellow. They are labeled R (right arm), L (left arm), and F (left leg).

Patient Location	100V	115V	230V
Left leg	Green	Red	Green
Right arm	Red	White	Red
Left arm	Yellow	Black	Yellow

To connect the leads to the patient:

Note: The system cannot display a trace unless all three leads are connected to a patient.

- Attach the ECG electrode patches to the patient in the locations specified above.
- Connect each lead to the appropriate patch.

Repositioning the Trace

The **Position** buttons position the trace up or down on the image screen. If you invert the image, you can use the **Position** buttons to position the trace on the top of the screen.

To reposition the trace:

1. Select **Position** up to adjust the trace upward.
2. Select **Position** down to adjust the trace downward.



Position Down.



Position Up.

Position buttons in **Physio** group box.

Changing the Trace amplitude

Use the **Gain** buttons to increase or decrease the amplitude of the ECG trace.

To change the amplitude of the trace:

1. Select increase **Gain** to increase the ECG trace amplitude.
2. Select decrease **Gain** to decrease the ECG trace amplitude.



Decrease/**Gain**.



Increase/**Gain**.

Gain buttons in **Physio** group box.

Changing the Trace Sweep Speed (2D-Mode Only)

Physio Sweep Speed allows you to adjust the scrolling speed of the trace. Select from five sweep speeds: **1**, **2**, **4**, **6**, and **8**. During Doppler or M-mode the trace has the same scrolling speed as the Doppler spectrum or M-mode sweep.

To adjust the trace sweep speed:

1. With a trace visible on the screen, select **Phys Swp** from the 2D-mode Parameter menu.
2. Rotate the **MENU** control clockwise to increase the sweep speed; rotate the control counterclockwise to decrease the sweep speed.
3. Press the **MENU** control to confirm the setting and disengage the control.

Removing the Trace from the screen

The **On** button removes the trace from the screen so you can view or capture the image without the trace.

To remove the trace from the screen:

1. Select the **On** button to remove the trace from the screen.
2. Select **On** again to redisplay the trace on the screen.



On/Off button in **Physio** group box.

Physio Troubleshooting Guide

ECG Troubleshooting Guide

Symptom	Possible Cause
ECG trace is not present, or displays as a flat line.	<ul style="list-style-type: none"> <input type="checkbox"/> The ECG cable is not properly attached to the system. <input type="checkbox"/> All three leads are not connected to the patient. <input type="checkbox"/> Leads are poorly connected to the cable. <input type="checkbox"/> Leads are poorly connected to the patient. <input type="checkbox"/> Leads are incorrectly placed on the patient. Remove the ECG patch, clean the skin, and attach a new ECG patch to the patient. <input type="checkbox"/> ECG gain is set too low. Increase the gain setting.
ECG trace is noisy, ragged, or erratic.	<ul style="list-style-type: none"> <input type="checkbox"/> A lead or leads may be detecting muscle movement. Inspect the ECG patch placement and reposition the lead(s) on the patient as necessary.

8 SieScape Imaging

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SieScape Imaging

⚠ WARNING: To avoid technique-related artifacts and measurement inaccuracies, read this entire chapter before using the SieScape feature.

Note: The SieScape Panoramic Imaging option is only compatible with systems equipped with the Stellar Performance package.

The SieScape™ Panoramic Imaging feature is a system option that allows the acquisition of two-dimensional ultrasound images with a composite, extended field of view.

Image creation begins with a standard field of view, which extends during steady, forward motion scanning. You can confine the created image within a single scan plane (for example, a transverse scan of the abdomen) or not confine the image to a single plane (for example, when following the path of a tortuous vessel).

Color SieScape Panoramic Imaging Option

Note: The Color SieScape™ Panoramic imaging option requires the SieScape Panoramic Imaging option.

Color SieScape imaging is a combination of real-time SieScape imaging and real-time Power mode acquisition, using a "Peak Hold" display technology. All Power information is preserved during image acquisition, and the peak of the signal is saved for the Color SieScape image.

Color SieScape imaging provides the same extended field of view technology as 2D-mode SieScape imaging. Functions and capabilities available in SieScape imaging, such as measurements and zoom, also apply to Color SieScape imaging.

Color SieScape imaging can be accessed from Color Flow imaging, Power imaging, or any mixed mode imaging containing color.

Intended Use

SieScape imaging is intended for the following uses:

- Imaging any structure where a field of view larger than standard real-time imaging is required; for example, large organs, masses, and long lengths of a vessel
- Depicting anatomic relationships over a larger area than that provided by standard 2D-mode imaging

Color SieScape imaging is intended for the following uses:

- Showing the presence of blood flow and 2D anatomy in exams such as OB or Abdominal Vascularity (for characterizing aortic abdominal aneurysms)
- Depicting Vascular studies with vein mapping or grafts

Transducer Compatibility

Any system-supported curved array or linear array transducer is compatible with SieScape imaging.

- Linear (preferred)
- Curved (not intended for performing tightly curved SieScape scans)
- Phased array (not intended for performing tightly curved SieScape scans)

Supported Study Types

All study types on the ultrasound system are compatible with SieScape imaging.



Transducer Reference

Transducers	Ch 1
-------------	------

SieScape Imaging ■ Process Overview

SieScape imaging includes three processes:

- **Setup.** Allows you to set the scanning parameters for the image you intend to capture.

During 2D-mode or 2D-mode with color, power, or any mixed mode imaging containing color, select the **Sie** button in the **Imaging** group box located on the **Image** task card to enter SieScape **Setup**.

- **Acquire.** Builds the composite image as you move the transducer.

During **Setup**, select the **Start** button in the SieScape **Imaging** group box or press the **UPDATE VIEW** key to enter **Acquire**.



Start button.

- **Review.** Presents the frozen composite image for your review.

During **Acquire**, select the **Stop** button in the SieScape **Imaging** group box or press the **FREEZE** key to enter Review. Pressing the **FREEZE** key reactivates SieScape **Setup** on the **Image** task card.



Stop button.

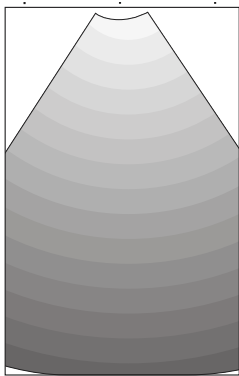
Creating a SieScape Image

This section describes how to create a SieScape image, using the processes for **Setup** and **Acquire**.

Image Setup

When you enter SieScape Setup, a **bounding box** displays on the 2D-mode image. This indicates the portion of the scanned image used to create the composite image.

During Color SieScape imaging, the Power ROI displays within the bounding box. The Power ROI indicates the area of Power data that can be acquired during acquisition. The percentage of the Power ROI used in a Color SieScape image acquisition depends on the **AcqFrac** setting on the Color SieScape Parameter menu.



With curved array transducers or linear transducers in a sector format, the bounding box is rectangular. With linear transducers, the bounding box should not exceed the lateral boundaries of the image. If necessary, decrease the image depth to increase the image size so the image fills the bounding box.



System Reference

IMAGE:	
Linear transducer format	Ch 2
Depth adjustment	Ch 2
Color SieScape Parameter menu	8-8

Activating SieScape Imaging

For systems installed with the color SieScape option, the system displays SieScape-specific selections on the Color Flow Parameter menu during the Setup and Acquire processes.

To enter Setup:

Note: During SieScape setup only, the **UNIVERSAL 1** control is assigned to **Transmit Frequency**, and the **UNIVERSAL 2** control is assigned to the flow rates for color and power imaging.

- Select the **Sie** button in the **Imaging** group box located on the **Image** task card.

A **bounding box** displays on the 2D-mode image. This indicates the portion of the scanned image used to create the composite image.

Note: During Color SieScape imaging, the Power ROI displays within this bounding box. You can roll the trackball to position the Power ROI axially, but not laterally.

The system activates one focal zone and sets the **Persist** 2D-mode Parameter selection to zero. You can adjust the position of the focal zone marker, however, you cannot adjust the number of focal zones or persistence setting during SieScape imaging.

Note: During Color SieScape imaging, the Color **Persist** parameter is adjustable using the Color Parameter menu during the Setup and Acquire processes.

Color SieScape Parameter Menu

The selections in the Color SieScape Parameter menu are available during the Setup and Acquire processes. Use these selections to optimize and acquire a Color SieScape image.

Menu Selection	Description
AllPwr	Activates or deactivates the Power display in the ROI. When On , Power data is visible on the real-time image. When Off , Power data is captured and displays in the SieScape image.
Color Cap	Enables continuous capture of Power data without transducer movement. Adds the Power component even when there is insufficient motion for acquiring a black and white SieScape image.
Flow	Activates or deactivates Power mode without stopping image acquisition.
AcqFrac	Adds either 100 percent of the Power ROI data (On) or 30 percent of the Power ROI data (Off) to the SieScape image during SieScape image acquisition.

Deactivating the Power Display

You can deactivate the Power display in the ROI for the purpose of orientation (such as aligning the image in the same plane) and for identification of pathology. Use the **AllPwr** (All Power) Color SieScape Parameter menu selection to deactivate the Power display. Power data is still captured and displayed on the SieScape image.

To activate the AllPwr display:

- Select **AllPwr On** from the Color Parameter menu.
Power data is visible on the real-time image.

To deactivate the AllPwr display:

- Select **AllPwr Off** from the Color Parameter menu.
The Power data disappears from the real-time image but still displays on the SieScape image.

Capturing Color

You can enable continuous capture of Power data even without any transducer movement. This is useful for vessel filling (phasic flows) and ensures capturing flow on the SieScape image even for small low-flow vessels.

Note: Capturing 2D-mode data still requires sufficient transducer movement.

To use Color Capture:

1. Select **Color Cap On** from the Color SieScape Parameter menu.
It is now possible to capture the flow data on the SieScape image for low-flow vessels.
2. To deactivate the ap display, select **Color Cap Off**.

Deactivating Flow in the SieScape Image

You can temporarily disable acquisition of the Power data, and then restart the Power data without stopping image acquisition. The result is an image that is partially grayscale and partially color.

Note: When **Flow** is deactivated and you **Pause** and then **Continue** image acquisition, the captured data will still contain Flow information.

To activate the Flow display:

- Select **Flow On** from the Color SieScape Parameter menu.
The Power Flow displays on the real-time and the SieScape images.

To deactivate the Flow display:

- Select **Flow Off** from the Color SieScape Parameter menu.
The Power Flow display is deactivated. No Flow data displays on the real-time or the SieScape image.

Setting the Acquisition Fraction

You can assign the portion of the Power data being accumulated for the SieScape image. Minimize the setting at 30% of the Power ROI or maximize the setting at 100% of the Power ROI. Choose the minimum setting for preserving fine detail and the maximum setting for a more persistent effect.

To select the Acquisition Fraction:




- Select **AcqFrac On** from the Color Parameter menu to maximize the selection area and display 100% of the ROI bounding box.
- Select **AcqFrac Off** from the Color or Power Parameter menu minimize the selection area and display 30% of the ROI.

Image Acquisition

During the **Acquire** process, the system builds the composite image and indicates the status of your scan with a speed indicator and reference indicator. These indicators are located on the **Image** task card in the SieScape **Imaging** group box.

Speed Indicator

The system displays the speed indicator on the SieScape **Imaging** group box during SieScape image acquisition. Optimal scanning speed is indicated when the circle is white. The two-stage shading of the indicator guides you toward optimal scanning speed.

-  Below optimum scan rate – increase scan speed slightly
-  Optimum scan rate
-  Above optimum scan rate, nearing "tear" speed – decrease scan speed slightly

*The **Speed Indicator** indicates, by shading, the speed of scanning. To capture a SieScape image, use a steady speed.*

Scanning too slow can create unwanted compounding effects from patient breathing or erratic hand motion.

Scanning too fast can cause the image to **tear**, leaving small blank gaps in the image or jagged edges at the skin line and might cause the image to bend. Moving the transducer too fast can also distort the image geometry.

Reference Indicator

The reference indicator provides a "snapshot" of the entire SieScape image. Data displays in the reference indicator only during the SieScape **Acquire** process.



Example of a reference indicator.



System Reference

SieScape Setup	8-6
Technique Hints	8-19
SieScape Review	8-13

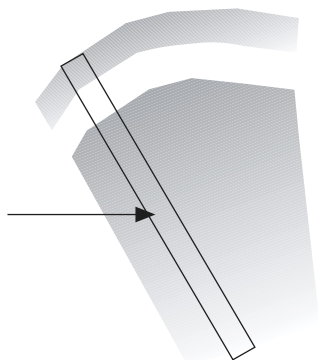
Acquiring the SieScape Image

During image acquisition, you can use the Pause and Erase functions to acquire an optimum composite image.

To enter Acquire:

1. After entering SieScape **Setup**, select the **Start** button in the SieScape **Imaging** group box or press the **UPDATE VIEW** key and then slowly and steadily scan in the desired direction.

The system builds the composite image and indicates your scan speed with the speed indicator.



To help guide the alignment of the scan, the system displays a graphic ROI to indicate the boundary between the composite image and the real-time image.



Start button.

2. To stop image acquisition, select the **Stop** button in the SieScape **Imaging** group box or press the **FREEZE** key.

Note: When the memory buffer for the SieScape image is full, the system automatically stops image acquisition and freezes the image.

The system enters SieScape **Review** and displays the **Compose** task card with the SieScape Parameter menu located on the left side of the screen.



Stop button.

3. To reactivate **Acquire**, press the **FREEZE** key.

The system redisplay the **Image** task card with the **Sie** button active in the **Imaging** group box.

4. For systems installed with the color SieScape option, optimize the power display using the selections on the SieScape Color Flow Parameter menu.



System Reference

Color SieScape
Parameter menu 8-8

Pausing Acquisition/Capture Function

You can temporarily pause image acquisition without exiting Acquire. While SieScape image acquisition is paused, you can optimize the image and capture it without flashes. You can also preserve specific transient areas of interest on the image by capturing the complete image and adding it to the SieScape image. To resume image acquisition and add the complete image to the existing SieScape image, use the **Pause** button or **UPDATE VIEW** key again.



Pause button.

To pause image acquisition and capture the complete image:

1. During SieScape image acquisition, select the **Pause** button from the SieScape Imaging group box or press the **UPDATE VIEW** key.
2. Optimize the image, if necessary.
3. Select the **Pause** button or press the **UPDATE VIEW** key again to capture the complete image and resume SieScape image acquisition.

Erasing Function

You can erase portions of a SieScape image by scanning backwards. By erasing, you can remove artifacts, such as those introduced by lost contact. When you carefully move the transducer back over the region scanned, the system erases the image data within the ROI. When you resume forward motion, the system again constructs the SieScape image.

To erase a portion of the SieScape image:

1. During SieScape image acquisition, reverse the direction of image scanning.
2. To continue image acquisition, resume a forward scanning motion.

Reviewing a SieScape Image

Use SieScape **Review** after completing the **Setup** and **Acquire** process.

During **Review**, the system displays a flexible ruler along the skin line and lateral margins of the acquired image in 1 cm increments with a larger marker every 5 cm.

SieScape Parameter Menu

The system displays SieScape Parameter menu selections during the SieScape Review process on the **Compose** task card. Use the SieScape Parameter menu selections to resize the acquired image. You can also rotate and "pan" the image, depending on your image size.

Menu Selection	Description
Resize Fit (Resize Image)	Full scales the image to its full acquisition size. 1, 2, 3, 4, and 5 incrementally scale the image between Best Fit and Full .
Redisplay	Redisplay the SieScape image in the size and rotation selected prior to entering CINE.
Restore	Scales the SieScape image to the original display of the frozen image.
Best Fit	Automatically scales the image to fit the image area.
Flex Ruler	Displays a flexible ruler along the length of acquisition.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.

To enter Review:

1. After activating SieScape **Setup** and **Acquire**, select the **Stop** button in the SieScape **Imaging** group box or press the **FREEZE** key.

The system freezes the image and automatically scales the image to **Best Fit**.

2. Use the following procedures to size, rotate or "pan" a SieScape image.
3. To unfreeze the image and reactivate SieScape **Setup**, press the **FREEZE** key.

The system displays the **Image** task card with SieScape setup active as indicated by the bounding box on the image.

4. To activate standard 2D-mode imaging, press the **2D** control located on the control panel.

**System Reference**

IMAGE:	
Dynamic Range	Ch 2
Maps	Ch 2
Resizing	8-15
Rotating	8-16
Panning	8-16

Sizing an Image

Use the SieScape Parameter menu selections **Best Fit** and **Resize** to resize the image.

- **Best Fit** automatically scales the image to fit the image area.
- **Resize Full** scales the image to its full acquisition size.
- **Resize 1, 2, 3, 4,** and **5** incrementally scale the image between **Best Fit** and **Resize Full**.

The resize increments are not fixed values but are evenly spaced values based on the Best Fit size at the time. The Best Fit size is dictated by the selected rotation.

To size an image:

- To restore a scaled image to the original display of the frozen image, select **Resize Full** on the SieScape Parameter menu.
- To scale the image to fit the image area, select **Best Fit** on the SieScape Parameter menu and activate the **On** setting.
- To incrementally decrease or increase the scale of an image, select **Resize 1, 2, 3, 4,** or **5** on the SieScape Parameter menu.

Note: During SieScape imaging, you can also use the **UNIVERSAL 1** control to incrementally decrease or increase the scale of an image.

Rotating an Image

Rotation is possible on frozen SieScape images but not on SieScape images in CINE.

To rotate an image:

Note: If **Best Fit** is selected, rotating the image causes the system to automatically change the SieScape image's size to fit the image area.

1. Press the **NEXT** key on the control panel until the **Rotate** function is active, as indicated by the **Next** icon on the lower right of the screen.
2. Roll the trackball to turn the image in a clockwise or counterclockwise direction.
3. To pan the image (except when **Best Fit** is selected), press the **NEXT** key on the control panel to activate the **Pan** function and then roll the trackball.

Panning an Image

Use the trackball to "move" or "pan" an image that is larger than the display area of the screen. You cannot "pan" an image when **Best Fit** is selected.

To pan an image:

1. Press the **NEXT** key on the control panel until the **Pan** function is active, as indicated by the Next icon on the lower right of the screen.
2. Roll the trackball to move the image in a left/right and up/down direction.
3. To rotate the image, press the **NEXT** key on the control panel to activate the **Rotate** function and then roll the trackball.



System Reference

IMAGE:
CINE

Ch 5

Reviewing CINE Images

A SieScape image is composed of hundreds of single frames. You can use the CINE function to recall single frames for review.

As with 2D-mode CINE, there is a finite CINE memory capacity. When a large SieScape image is acquired, the CINE frames may not be viewable at the end of the scan.



System Reference

IMAGE:

CINE

Ch 5

To review SieScape images during CINE:


1. Roll the trackball left or right to display a "thumbnail" of the selected frame from the composite image on the right side of the image screen with a standard 2D-mode frame on the left side.

The center of the reference box on the composite image indicates the position of the displayed single frame from the composite image.

2. Use the CINE wheel to move the reference box left or right to review all available 2D-mode CINE frames.
3. Select **Redisplay** on the SieScape Parameter menu to redisplay the image in the size and rotation selected prior to entering CINE.

Note: You can also use the **UNIVERSAL 2** control to select **Redisplay**.

Measuring a SieScape Image

 **WARNING:** To ensure accuracy, measurements should only be made on SieScape images that are acquired in a single scan plane.

You can make linear, elliptical, and trace 2D-mode measurements on a frozen, full-sized or best fit, composite image:

To ensure accurate results, measurements should not be made:

- On images that do not follow a single plane (for example, when tracking a tortuous vessel). An out-of-plane image shows the contour pattern of the skin line and the appearance of internal structures.
- Across a large shadow in a SieScape image
- Across gaps in an image, such as those encountered with a tightly curved scan
- Across those areas of the image where the flexible ruler along the skin line is jagged as this indicates that the image in this area has disrupted, which causes inaccurate measurements
- On an image with a swirl at the bottom

Note: If the structure to be measured is contained within the boundary of a single, standard 2D-mode frame, measurements should be made on the corresponding frame retrieved from CINE and not on the SieScape image. This avoids the possibility of including motion artifacts in a measurement.

To activate the measurement function during SieScape imaging:

Note: The system presets option to automatically activate the measurement function with the **FREEZE** key is not available during SieScape imaging.

1. When a SieScape image is frozen, press the **SELECT** key to activate the trackball pointer.
 2. Select the **Calcs** task card or press the **NEXT** key on the control panel.
- The system activates the measurement function.



System Reference

Technique Hints	8-19
CALCS:	
Measurement function	Ch 1



Basic System

SieScape Imaging ■ Technique Hints

This section includes information on how to obtain optimum SieScape images.

Adequate Gel

Apply a generous amount of coupling agent (gel) along the entire area to be scanned to avoid disrupting the scan sweep. Insufficient gel causes the transducer to drag on the skin.

Preview Sweep

Before acquiring a SieScape image, perform preview sweep of the scan plane in standard 2D-mode (or 2D-mode with color).

The maximum length of the composite image that can be acquired depends on the depth selected. That is, you can acquire approximately 8–10 times the selected depth for length (for example, for a linear SieScape scan).

Focus

To minimize possible bending artifacts, position the single focal zone in the optimum position as follows:

- Linear arrays – lower half of image
- Curved arrays – upper half of image

Gain

While in **Setup**, ensure the gain is balanced throughout the image. Low gain in the far field decreases the amount of data needed to ensure a geometrically correct SieScape image and can create a bending artifact.

When in **Acquire**, some of the image parameters cannot be changed (for example, number of focal zones, depth). Use the DGC, Gain, and Transmit Power controls to increase or decrease the gain in the image as you scan across structures of different densities.



System Reference

Setup Process	8-6
Acquire Process	8-11
Review Process	8-13

Transducer

To avoid excessive bending and to ensure a constant elevation position, hold the transducer so that your little finger is in contact with the skin alongside the transducer face. This acts as a guide to ensure that the transducer is parallel to and in full contact (perpendicular) with the skin surface.

Plane

To ensure that you are staying in plane or correctly following a vessel, watch the trailing edge of the real-time portion of the image, which is located in the ROI. The remainder of the real-time image should be used as a guide to correct your rotation, as necessary, while scanning forward.

Scan Area

Scanning over a long length of superficial bone (for example, in the lower leg), which occupies the full width of a single frame, creates shadowing. Therefore, there is not enough data in the lower half of the image, which can cause excessive bending of the SieScape image.

Speed and Depth

Optimum scanning speed depends on depth. The Speed Indicator is related to the depth setting and indicates the optimum scanning speed for the specific exam type and transducer.

An optimum scan is indicated when the gray outline of the SieScape image in the Reference Indicator is solid gray. If this bar appears broken, you may have scanned too fast.

Note: To obtain the optimum SieScape images, scan slowly. If you move off plane or off the required path, you can stop your forward scan motion and correct your orientation in the real-time portion of the image before continuing.



System Reference

Reference	
Indicator	8-10
Speed Indicator	8-10

SieScape Imaging ■ Avoiding Technique-Related Artifacts

⚠ WARNING: Technique-related artifacts unique to SieScape imaging can occur. Before using the SieScape imaging feature, be sure to read and understand the following information.

Plane Change Indications

A single plane image has a relatively smooth skin line contour. If the scan is "off plane", or off the required path, stop the forward scan motion and correct the scan orientation in the real-time image before continuing.

The following appearances in the image indicate a change in the plane:

- The skin line contour has the appearance of a "waving flag" and appears to have folds or shows a jagged broken skin line.
- Abrupt changes in boundaries (for example, boundaries that do not align) generally indicate that the plane has changed.

Note: As you scan, ensure that anatomy and structures display as contiguous on the image screen.

- A structure, which is visible in the real-time portion of the image, abruptly disappears at the composite boundary.

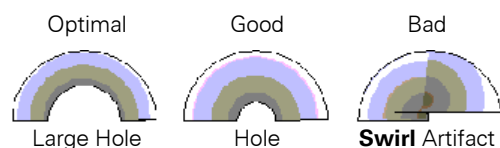
Artificial Compounding

Use a forward scanning motion to avoid an unwanted image-compounding effect, which appears as a brighter, distorted section of the SieScape image.

Swirl Artifact

Optimum SieScape imaging occurs when the scanned surface is flat or gently curved. If a tightly curved scan is performed, a **swirl** compounding artifact occurs where the image overlaps in depth. Therefore, when performing a tightly curved scan (for example, transverse slice through the calf), set the depth as shallow as possible.

The depth should be less than the radius of the target area being scanned. This leaves a blank "hole" in the image. If the depth is too deep, the bottom of the image appears swirled. Never use an image with a swirl at the bottom for measurements.





Example of curved SieScape images.

9 Cadence Contrast Agent Imaging

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Cadence Contrast Agent Imaging

-  **WARNING:** At the time of publication, the United States Food and Drug Administration has cleared ultrasound contrast agents only for use in LVO (left ventricular opacification). Check the current regulation for the country in which you are using this system for contrast agent clearance.
-  **WARNING:** Carefully follow manufacturers’ instructions for use, including indications and contra indications, when administering ultrasound contrast agents.

Cadence Contrast Agent Imaging (CCAI) is an optional system feature with wide-band, harmonic-imaging technology designed for use with contrast agents.

The CCAI option includes the following techniques:

- Ensemble Contrast Imaging (ECI) for assessment of perfusion
- Agent Emission Imaging (AEI) for detection of early-phase vascular structures or lesions
- Burst for assessment of re-perfusion

ECI is a low Mechanical Index (MI) technique; AEI and Burst are high MI techniques.

Intended Use

CCAI is intended for use with contrast agents to evaluate perfusion characteristics of tissue and enhance vascular visualization.

Compatibility

CCAI is available for the following exam types:

- Abd-Detailed
- Abd-Difficult
- Abdomen
- GYN
- Pelvis
- Renal



Instructions for Use	
Compatible transducers	Ch 6

Operating Modes

CCAI is available in the following operating modes:

- 2D
- 2D/Doppler
- 2D-mode with color
- 2D-mode with power
- 2D/Doppler with color
- 2D/Doppler with power

Note: In modes that include Doppler, the **Trig** control is not available.

Activating CCAI

When you activate CCAI, the system displays **MI** (Mechanical Index) and **MIF** in 1/100 precision on the upper left of the screen. The system also displays the CCAI parameters.

Note: **MIF** is the Maximum of the Mechanical Indices measured at the active focal zones (displayed during CCAI exams only).

To activate CCAI:

1. Press the **2D** mode control on the control panel.
The system displays the **Image** task card, with **GEN** displayed on the 2D-mode Parameter menu next to the **2D** status icon to indicate that general 2D-mode imaging is active.
2. Rotate the **2D** secondary mode control (outer ring) to activate CCAI.
The system indicates the **CCAI** feature is active on the 2D-mode Parameter menu next to the 2D status icon.
3. To activate a supported mixed imaging mode, press the required mode control on the control panel.
4. To exit a supported mixed imaging mode but retain CCAI activation, press the **2D** control.
5. To exit **CCAI**, rotate the **2D** secondary mode control (outer ring) to reactivate 2D-mode imaging.



System Reference

IMAGE:
2D-Mode Imaging Ch 2

Optimizing CCAI

For each combination of study type and transducer that is supported for use with CCAI, preconfigured factory settings for filters, overall gain, and other system parameters are coordinated with Siemens patented data sequencing techniques to provide optimal viewing of blood flow when the contrast agent is injected.

You can adjust general imaging parameters, such as the transmit power, transmit frequency, focal zones, and dynamic range.

The system retains your changes to the technique selection (AEI/ECI), **Trig**, and **Burst FR** parameters for the current study, exam type, and transducer.



System Reference

IMAGE:
2D-Mode Imaging Ch 2

Adjusting the Frame Rate

You can adjust the number of frames to be acquired per second (frame rate) using the **Trig** parameter on the 2D Parameter menu. During CCAI imaging, use the **Trig** parameter to prolong the life of micro-bubbles. You can also use this parameter without activating CCAI.

Note: **Trig** is not available for M-mode or Doppler.

The current system frame rate, labeled "fps", is displayed on the right of the screen. When you select a frame rate that is lower than the current system frame rate, the system reduces its frame rate to the selected setting by adding a delay between frames. When you disable the **Trig** parameter or select a frame rate setting higher than can be achieved, the system uses the maximum achievable frame rate, which is dependent on depth, number of focal zones, and other settings.

The range of settings for the **Trig** parameter is specific to the selected transducer.

To change the frame rate (Trig):

1. Select **Trig** from the 2D-mode Parameter menu on the **Image** task card.
2. Rotate the **MENU** control clockwise to increase the frame rate; rotate the **MENU** control counterclockwise to decrease the frame rate.
3. Press the **MENU** control to confirm the setting and disengage the control.

Starting and Stopping the Timer

The system displays the elapsed time (in seconds, minutes, and hours) since the timer was activated and records the value on frames in the CINE buffer. You can start, stop, or restart the timer at any time. The timer continues to track the elapsed time when the image is frozen.

00:05:25.02

The timer displays elapsed time on the lower right of the screen and is also available when CCAI is not activated. The elapsed time is displayed in the format hh:mm:ss, where hh is the hour, mm is the minute, and ss is the second.

To start (or restart) the Timer:

- Select **Timer** on the Parameter menu on the **Image** task card to change the displayed selection to **Off**.

To stop the Timer:

- Select **Timer** on the Parameter menu on the **Image** task card to change the displayed selection to **On**.

Displaying the Recorded Time on CINE Frames

When the image is frozen and the CINE wheel is rotated, the system also displays the time recorded on frames in the CINE buffer.

The system displays the recorded timer value (if any) for the current CINE frame, in 1/100 seconds. The recorded timer value is displayed to the left of the timer (if active). The system displays the value **00:00:00.00** if the timer was disabled during acquisition of the current frame but was enabled during acquisition of at least one other frame in the CINE buffer. The recorded time is displayed in the format hh:mm:ss.nn, where hh is the hour, mm is the minute, ss is the second, and nn is 1/100 seconds.

To display the recorded time on CINE frames:

Note: The timer must be active when you freeze the image.

- Press the **FREEZE** key to activate CINE and then rotate the **CINE WHEEL**.

Using the Ensemble Contrast Imaging (ECI) Technique

Cadence Ensemble Contrast Imaging (ECI) is a low Mechanical Index (MI) continuous real-time imaging detection technique that provides contrast-to-tissue specificity using phase inversion technology in 2D-mode.

Use ECI to assess perfusion.

To activate ECI:

1. Select **ECI-Low MI / AEI-Hi MI** from **Page 2 of 2** on the Parameter menu on the **Image** task card.
2. Rotate the **MENU** control clockwise to display **ECI-Low MI**.
3. Press the **MENU** control to confirm the setting.

Using the Agent Emission Imaging (AEI) Technique

Cadence Agent Emission Imaging (AEI) is a high Mechanical Index (MI) imaging technique that uses the emission properties of contrast agents to characterize their presence or absence in the tissue.

Use AEI for parenchymal and late-phase radiology imaging applications and to detect early-phase vascular structures or lesions.

To activate AEI:

1. Select **ECI-Low MI / AEI-Hi MI** from **Page 2 of 2** on the Parameter menu on the **Image** task card.
2. Rotate the **MENU** control counterclockwise to display **AEI-High MI**.
3. Press the **MENU** control to confirm the setting.

Using the Burst Technique

Burst is a high Mechanical Index (MI) technique designed to rapidly destroy the injected contrast agent bubbles for a view of re-perfusion immediately afterwards.

Use the Burst process to assess re-perfusion by observing the time required for the contrast agent bubbles to refill the burst area.

Before activating the Burst process, set the number of Burst frames. The duration of the Burst process is determined by this setting.

Note: CCAI settings (except timer) are not available during the Burst process. The **Trig** parameter has no effect during the Burst process.

When the system acquires the selected number of Burst frames, the Burst process is complete and the system automatically activates ECI to allow imaging of the target tissue as it is replenished with the contrast agent.

To select the number of Burst frames:

1. Select **Burst FR** from **Page 2 of 2** on the Parameter menu on the **Image** task card.
2. Rotate the **MENU** control clockwise to increase the number of Burst frames; rotate the control counterclockwise to decrease the number of Burst frames.
3. Press the **MENU** control to confirm the setting and disengage the control.

To activate the Burst process:

- Select **Start Burst** from **Page 2 of 2** on the Parameter menu on the **Image** task card.

Saving CCAI Settings for Later Patient Examinations

You can save CCAI settings and retrieve them for later studies or examinations. To save these settings, create a user-defined exam type. The user-defined exam type automatically saves the following CCAI settings:

- **AEI/ECI**
- **Trig**
- **Burst FR**



System Reference

IMAGE:
User-Defined
Exam Type Ch 2

CCAI ■ Clinical Tips

This section includes information on how to obtain optimum images using Cadence Contrast Agent Imaging.

Artifacts

Certain limitations are inherent in CCAI. The following paragraphs detail how to work within these limits and how to avoid creating artifacts.

Shadowing

Acoustic shadowing can occur posteriorly where a large concentration of contrast agent is taken up in a specific area. This is a temporary effect and usually occurs only at peak enhancement.

Double Line

A double line, or ringing artifact, can sometimes be seen where a very bright interface is horizontal to the incident beam. You can eliminate this artifact by reducing the receive gain and slightly increasing the transmit power.

Burst Rate Increase in 2D-Mode

Different contrast agents burst at different acoustic pressures. To increase the rate of burst, increase the mechanical index (MI) by one of the following techniques:


- Increase the transmit voltage
- Set the 2D frequency to 2 MHz
- Decrease the frame rate
- Position the focus to the area of interest (to concentrate the burst effect to a specific region) or set two focal zones

10 3-Scape Imaging

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3-Scape Imaging

 **WARNING:** To avoid technique-related artifacts, read this entire chapter before using the 3-Scape feature.

The 3-Scape™ Real-Time 3D Imaging feature is a system option that allows the acquisition of three-dimensional ultrasound images. Multi-Planar Reformatting (MPR) provides a view of each portion of the volume as an **arbitrary slice**.

Ultrasound data based on three-dimensional imaging methods can assist the diagnostic process. 3-Scape anatomical volumes are suited for viewing and post processing (for example, arbitrary slicing, volume rendering, rotation and magnification of localized areas of interest).

Intended Use

The 3-Scape imaging feature can be used to image any structure where a view cannot be achieved by standard 2D-mode ultrasound to improve understanding of complex structures (for example, the coronal view of any organ and oblique [arbitrary] slices of fetal anatomy).

3-Scape imaging is intended for the following uses:

- Imaging of volumes to improve diagnostic analysis.
- Rotation of 3-Scape images (volume and slices) to view aspects of a structure that cannot be imaged directly.
- Examination of complex vascular structures and circulatory systems.

Compatibility

The 3-Scape imaging feature is compatible with several imaging transducers. You can activate 3-Scape imaging for any study type or exam type if the active transducer supports the feature.

When using the 3-Scape imaging feature, you can obtain images by one of the following methods:

- **Linear:** A linear scanning motion.
- **Rocked:** An angular scanning motion, during which the transducer face is used as a pivot (does not slide).

Operating Modes

The 3-Scape imaging feature can be used in the following operating modes:

- 2D-mode
- Power mode



Instructions for Use

Compatible transducers	Ch 6
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3-Scape Imaging ■ Process Overview

The following steps are involved in completing and reviewing a 3-Scape examination.

- **Set up.** Optimize the image and select settings for the volume acquisition.

Preparation for volume acquisition begins with scanning in 2D-mode. You can adjust the imaging parameters for the current transducer and exam type. You can activate Power mode to include Power mode data in the volume acquisition.

After activating 3-Scape imaging, you can define a 3-Scape ROI to limit acquisition to the data contained within the ROI.

Select a method for the scan that is appropriate to your transducer. Select the length or angle, and select a scanning speed. The system estimates the duration for the volume acquisition based on your selections and then displays a time gauge to help you maintain a steady scan speed.

- **Acquisition.** The system displays the 2D-mode (or 2D-mode and Power mode) image on the left of the screen and displays the incremental volume slice (acquired image) and time gauge on the right of the screen. The incremental slice is the mid-plane perpendicular to the 2D scan plane.

Scan in a single, continuous sweep, using careful scanning technique. The time gauge indicates the progress of the volume acquisition.

When acquisition is complete, the system automatically processes the volume data and displays a high-resolution volume.

- **View.** Rotate, view, and perform post-processing on the volume using the **Compose** task card.

You can view an arbitrary slice from a volume. The system simultaneously displays the orthogonal slices.

You can use opacity and shading controls to emphasize or remove data within the volume for enhanced visualization.



System Reference



IMAGE:	
2D-mode imaging	Ch 2
Power mode imaging	Ch 3

Setting Up 3-Scape Imaging

Use the 3-Scape acquisition controls to set up 3-Scape imaging for volume acquisition.

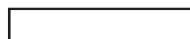
3-Scape Selections on the Image Task Card

The system displays 3-Scape selections for volume acquisition on the **Imaging** group box on the **Image** task card.

Icon	Selection	Description
	3-Scape	Activates 3-Scape imaging and displays the 3-Scape acquisition controls.
—	Scan Method	Selects the scan method for volume acquisition.
—	Scan Length/Angle	Selects the scan length or scan angle for volume acquisition.
—	Scan Speed	Selects the scan speed for volume acquisition.
	3-Scape Region of Interest (ROI)	Activates display of the 3-Scape ROI.

Preparing for 3-Scape Volume Acquisition

When you activate 3-Scape imaging, the system displays volume acquisition controls and splits the real-time image screen. The 2D-mode (or 2D-mode and Power mode) image is displayed on the left of the screen and the incremental volume slice and time gauge are displayed on the right of the screen, within the 3-Scape acquisition area.



35cm /70sec

*The time gauge is displayed on the right of the **Image** task card after 3-Scape imaging is activated. The time gauge depicts the scan length or angle and the scan duration.*

As you set up 3-Scape imaging, the system updates the scan length/angle and scan duration depicted on the time gauge. The system computes the scan duration based on the selected scan length or angle range, acquisition speed, and the current frame rate. The seconds of the scan duration is the amount of time required by the system to acquire the volume.

The system uses brackets to indicate the recommended scan speed in the **Scan Speed** drop-down menu on the **Imaging** group box. The system indicates the maximum achievable scan length or angle (if applicable) with a white line between the two values in the **Scan Length/Angle** drop-down menu on the **Imaging** group box. If you select the higher value, then the system acquires the largest amount of data possible. For example, if you select **40 cm** when the system displays a white line between **30 cm** and **40 cm**, then the system may acquire 38 centimeters of data.

The time gauge displays the actual length or angle for acquisition. A length or angle that is lower than the selected value is displayed as black characters on a white background.

Image optimization must be completed before acquisition as only the following imaging parameters are available during acquisition:

2D-mode parameters	Power mode parameters
Depth-gain compensation	Depth-gain compensation
maps	maps
tint	priority
dynamic range	display color
gain	

Note: 2D persistence is disabled when 3-Scape imaging is active.

When you activate a 3-Scape ROI, the system aligns the position of the 3-Scape ROI with the position of the Power ROI (if one exists). The system outlines the active ROI in green. If you reposition one ROI (3-Scape or Power), then the system repositions the other ROI (3-Scape or Power) to maintain their alignment.

To set up 3-Scape imaging:

1. Select the **3D** button in the **Imaging** group box on the lower left of the **Image** task card.
2. Optimize the 2D-mode image using the 2D-mode Parameter menu on the **Image** task card.
3. To activate display of the 3-Scape ROI, select the **3D ROI** button on the **Imaging** group box and then size and position the ROI using the **NEXT** key and trackball.
4. To include Power mode data in the volume acquisition, activate Power mode and then size, position, and steer the Power region of interest (ROI) as required.

Note: To select an ROI, either use the trackball and the **SELECT** key, or press the **PRIORITY TOOL** key to cycle through the 3-Scape ROI, the Power-mode ROI, and the 2D FOV. Size and position the ROI using the **NEXT** key and trackball.

5. If Power mode is activated, then optimize the Power mode image using the Power mode Parameter menu on the **Image** task card.
6. Select the linear or rocked scan method from the **Scan Method** drop-down menu on the **Imaging** group box.
7. Select a scan length or angle from the **Scan Length/Angle** drop-down menu on the **Imaging** group box.
8. Select a scan speed from the **Scan Speed** drop-down menu on the **Imaging** group box.

Note: The 3-Scape ROI cannot be steered.

To exit 3-Scape imaging:

- Select the **2D** button in the **Imaging** group box on the **Image** task card, or press the **2D** mode control.

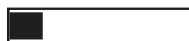


System Reference

IMAGE:	
Imaging	
parameters	Ch 2
Power mode	Ch 3
3-Scape Imaging	
Technique Hints	10-28

Acquiring a Volume

During 3-Scape volume acquisition, the system updates the incremental volume slice and indicates the elapsed time on the time gauge. The incremental slice is the mid-plane perpendicular to the 2D scan plane. Use the incremental slice to assess imaging artifacts. Use the time gauge to estimate an optimal scanning speed.



35cm /70sec

During acquisition, the time gauge depicts the elapsed time in addition to the scan length or angle and the scan duration.

If Power mode was activated when you set up 3-Scape imaging, then the system simultaneously acquires 2D-mode data and Power mode data. Each set of data (2D-mode data and Power mode data) is maintained separately, enabling you to view a 3-Scape volume using either or both sets of data.

When the scan duration listed on the time gauge elapses, the system beeps to indicate that volume acquisition is complete. You can complete volume acquisition before the scan duration on the time gauge elapses by pressing the **FREEZE** key.

To acquire a 3-Scape volume:

1. Follow the procedure to set up 3-Scape imaging.
2. Press the **UPDATE VIEW** key to begin acquisition, and then slowly and steadily scan. For a rocked scan, use the transducer face as a pivot.

The system beeps to indicate that volume acquisition has begun.

3. To cancel the acquisition (for image artifact or other reason), press the **UPDATE VIEW** key.

The system displays the **Image** task card to begin another volume acquisition.

4. To complete volume acquisition before the scan duration on the time gauge elapses, press the **FREEZE** key.

The system processes the acquired information into one or more data sets for the 3-Scape volume and then displays the volume within the **Compose** task card.

Note: If you press the **FREEZE** key a second time, the system redisplay the **Image** task card to begin another volume acquisition.



System Reference

Preparing for Acquisition	10-5
Viewing the Volume and Slices	10-8

Viewing the Volume and Slices

When you complete volume acquisition or retrieve a volume from a previous examination, the system initially displays the volume and slices in the quadrant display format.

Quadrants are labeled A, B, C, and D. Quadrant C (the upper-right quadrant) contains the volume. Quadrants A, B, and D contain arbitrary slices of the volume, initially oriented at the center of the volume; each slice is orthogonal to the other two slices. The slices are also referred to as Multi-Planar Reformatting (MPR) quadrants. A marker (focal point) within each slice quadrant indicates the point of intersection of the slices. The system initially displays the markers at the center of each slice.

You can select a display format, select a quadrant, display the acquired 2D-mode data and/or Power mode data, remove data from the volume to reveal anatomical structures, and change the surface appearance of the volume. You can use these post-processing functions to help differentiate anatomic structure. You can also rotate the volume and reposition slices.



System Reference

Preparing for Acquisition	10-5
Acquiring a Volume	10-7

3-Scape Selections on the Compose Task Card

The system displays 3-Scape selections on the **Compose** task card for viewing, displaying, selecting, and editing the 3-Scape data set(s). These selections are available on the 3-Scape Parameter menu, 3-Scape **Editing** group box, and 3-Scape **Animation** group box.

3-Scape Parameter Menu Selections

The 3-Scape Parameter menu includes general selections and mode-specific selections. General selections apply to the entire 3-Scape data set while mode-specific selections apply to data of the specified mode only.

To display or change settings for 3-Scape data of a specific mode (2D-mode or Power mode):

- Select the priority mode indicator on the 3-Scape Parameter menu.

Note: A Parameter menu may have two pages of selections. To access the menu selections, roll the trackball to the **Page 1 of 2** indicator or the **Page 2 of 2** indicator on the Parameter menu and then press the **SELECT** key.

General Selections for 3-Scape Imaging

Menu Selection	Description
Quadrant	Selects (activates) a quadrant: A , B , C , or D .
Rendering Method	<p>Selects a display method for the volume quadrant:</p> <ul style="list-style-type: none"> ▪ Slice—Displays a one-voxel-thick slice in its three-dimensional context. The displayed slice (within the volume) corresponds to the most recently selected slice (Multi-Planar Reformatting, or MPR) quadrant. ▪ Opaque—Displays the outer surface only. ▪ Surface Opacity—Smooths image contours, creating a soft, sculptured appearance for highlighting surface features. Uses the mode-specific selections for opacity percentage and thresholds. ▪ Surface Shading—Heightens contrast, creating a textured appearance for highlighting internal features. Uses the mode-specific selected shading in addition to the mode-specific selected opacity percentage and thresholds.
Display	<p>Limits display to the selected set of data: 2D-mode data and/or Power mode data. 2D or 2D + C is available for any selected quadrant. C is available for the volume quadrant when the selected rendering method is Surface Opacity or Surface Shading.</p> <p>Note: This selection is available only when the volume includes acquired Power data.</p>
Format	Toggles full-screen display of selected quadrant (1:1) with display of all quadrants (4:1).
Wireframe	Enables or disables the display of the wireframe in the volume quadrant.
Reset	<p>Adjusts the orientation of quadrants:</p> <ul style="list-style-type: none"> ▪ Center—On each slice, repositions the focal point to the center of the quadrant. ▪ Sync—Aligns slice and volume orientations. When the selected quadrant is a slice, aligns the orientation of the volume quadrant to that of the slice quadrant. When the selected quadrant is the volume quadrant, aligns the orientation of all slice quadrants to that of the volume quadrant. ▪ Reset Orientation—Restores the default orientation for all quadrants. ▪ Reset All—Restores the default orientation and display format for all quadrants; also restores the default (or user-defined) settings of other parameters for all quadrants. User-defined settings are those that were in effect when the current volume was first displayed.

2D-Mode-Specific Selections for 3-Scape Imaging

The system applies opacity and shading settings to the volume quadrant only.

- The opacity settings (**Low Th**, **High Th**, **Opacity**, and **Bright**) are available for the rendering methods **Surface Opacity** and **Surface Shading** only.
- **Shading** is available for the rendering method **Surface Shading** only.

To adjust opacity and shading settings for the 2D-mode data within the volume quadrant (when the volume also includes Power mode data), first limit the display to 2D-mode data.

Menu Selection	Description
Plane	Enables or disables the cut plane for 2D-mode data in the volume. When enabled, the volume does not display any 2D-mode data beyond the cut plane.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels. Applies the selected curve to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected curve to all slices. If the selected rendering method is Slice or Opaque , applies the selection to all quadrants.
DR	Controls the overall contrast resolution. Applies the selected resolution to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected resolution to all slices. If the selected rendering method is Slice or Opaque , applies the selection to all quadrants.
Tint	Applies the selected tint to the selected quadrant. If a slice (MPR) quadrant is selected, applies the tint to all slices. If the selected rendering method is Slice or Opaque , applies the selection to all quadrants.
Low Th (Low Threshold)	Sets the low threshold for the opacity curve. A narrower range between Low Th and High Th creates a more saturated image. Selectively eliminates darker gray shades, background noise, and "snow" from the 2D-mode data in the volume by removing voxels with values below the selected low threshold. As you adjust the setting, the system briefly maps green color to the voxels in the slice (MPR) quadrants that have values below the new setting.
High Th (High Threshold)	Sets the high threshold value for the opacity curve. A narrower range between Low Th and High Th creates a more saturated image. Emphasizes voxels of 2D-mode data that have values above the selected high threshold. As you adjust the setting, the system briefly maps blue color to the voxels in the slice (MPR) quadrants that have values above the new setting.
Opacity	Adjusts the percentage of opacity in the volume to smooth image contours.
Shading	Adjusts the percentage of shading in the volume to heighten contrast.
Bright	Adjusts the percentage of brightness in the 2D-mode data of the volume. An increase in brightness increases the saturation of voxels that have a higher voxel value and increases the brightness of voxels that have a lower voxel value.

Power Mode-Specific Selections for 3-Scape Imaging

The system applies opacity and shading settings to the volume quadrant only.

- The opacity settings (**Low Th**, **High Th**, **Opacity**, and **Bright**) are available for the rendering methods **Surface Opacity** and **Surface Shading** only.
- **Shading** is available for the rendering method **Surface Shading** only.




To adjust opacity and shading settings for the Power mode data within the volume quadrant, ensure that the display includes Power mode data.

Menu Selection	Description
C Plane	Enables or disables cut plane for Power data in the volume. When enabled, the volume displays no Power data beyond the 2D cut plane.
Maps	Selects a processing curve that assigns flow amplitudes to color levels. Applies the selected map to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected map to all slices. If the selected rendering method is Slice or Opaque , applies the selection to all quadrants.
Priority	Adjusts the tissue rejection level threshold for the amplitude of the Power display. Applies the selected threshold to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected level to all slices. If the selected rendering method is Slice or Opaque , applies the selection to all quadrants.
Low Th	Sets the low threshold for the opacity curve. A narrower range between Low Th and High Th creates a more saturated image. Selectively eliminates lower amplitude data and background noise from the Power mode data in the volume by removing voxels with values below the selected low threshold. As you adjust the setting, the system briefly maps green color to the voxels in the slice (MPR) quadrants that have values below the new setting.
High Th	Sets the high threshold value for the opacity curve. A narrower range between Low Th and High Th creates a more saturated image. Emphasizes voxels of Power mode data that have values above the selected high threshold. As you adjust the setting, the system briefly maps blue color to the voxels in the slice (MPR) quadrants that have values above the new setting.
Opacity	Adjusts the overall percentage of opacity in the volume to smooth image contours.
Shading	Adjusts the percentage of shading in the volume to heighten contrast.
Bright	Adjusts the percentage of brightness in the Power mode data of the volume. An increase in brightness increases the saturation of voxels that have a higher voxel value (color data) and increases the brightness of voxels that have a lower voxel value (color data).


3-Scape Editing Group Box (Option)

Use the **Editing** group box to define an area within the volume to be removed. The system removes displayed data only (2D-mode data and/or Power mode data).

Note: The system dithers the **Editing Menu** selections and the general selections from the 3-Scape Parameter menu (except **Wireframe**) while the volume is automatically rotating.

Menu Selection	Description	Icon
Polygon	Defines an irregular area from a drawn outline and then removes all the voxels inside or outside of that area.	
Parallel Cut	Selects a plane (layer) within the volume and then removes all the voxels outside the selected plane. Note: This selection is available during display of 2D-mode or 2D-mode and Power mode; it is not available when only Power mode data is displayed.	
Niche	Removes all the voxels from the nearest corner of the volume to a selected depth inside the volume. Note: This selection is available during display of 2D-mode or 2D-mode and Power mode; it is not available when only Power mode data is displayed.	
Undo Last Edit	Removes the most recent edit. You can repeatedly select Undo Last Edit to sequentially remove several previous edits.	—
Undo All Edits	Removes all edits.	—

3-Scape Animation Group Box (Option)

Menu Selection	Description	Icon
Automatic Rotation	Automatically rotates the volume according to the selected range, speed, and axis. Note: The system dithers the Editing selections and the general selections from the 3-Scape Parameter menu (except Wireframe) while the volume is automatically rotating.	
Rotation Range	Selects rotation range (in degrees): 30, 60, 90, 120, 180, 240, 300, 360 . For the 360 selection, the volume continuously rotates in one direction around the selected axis (for Axial , to the right; for Lateral , downward). For other selections, the volume rotates in both directions around the selected axis (for Axial , first right, then left; for Lateral , first downward, then upward).	—
Rotation Speed	Selects rotation speed: Slow, Medium, or Fast .	—
Rotation Axis	Selects rotation axis: Axial or Lateral .	—

Selecting a Display Format

You can select either quadrant display format or full-screen display format for display on the **Compose** task card.

In the quadrant display format, the system displays the volume and the three slices. In full-screen display format, the system magnifies the selected quadrant.

To change the display format:

- Double-click the **UPDATE VIEW** key, or
- Select **Format** on the 3-Scape Parameter menu and then rotate the **MENU** control to change the setting.

Selecting a Quadrant

On the **Compose** task card, the system outlines the selected quadrant in green and displays a colored line in the volume quadrant to indicate the relative position of the most recently selected slice.

To select a quadrant on the Compose task card:

Note: If the trackball is already assigned to a quadrant, press the **SELECT** key located on the control panel to allow selection of another quadrant.

- Roll the trackball to the quadrant and press the **SELECT** key, or
- Select **Quadrant** on the 3-Scape Parameter menu and then rotate the **MENU** control to select a quadrant.

Displaying 2D-mode and Power Mode Data

If the volume includes Power mode data, then you can limit the displayed volume data to 2D-mode data and/or Power mode data.

A unique set of data can be displayed in the volume quadrant and in the slice quadrants. **2D** or **2D + C** is available for any selected quadrant. **C** is available for the volume quadrant when the selected rendering method is **Surface Opacity** or **Surface Shading**.

The system applies your selection to the selected quadrant. If the selected quadrant is a slice, then the system applies your selection to all slices.

To display the 2D-mode data set and/or the Power mode data set:

1. Select either the volume quadrant or a slice quadrant.
2. Select the data set(s) from **Display** on the 3-Scape Parameter menu.

Rendering a Volume

You can select a rendering method and adjust opacity, shading, and brightness to change the surface appearance of the volume. These settings can improve contrast resolution and transparency and clarify surface detail.

Selecting a Rendering Method

The rendering method determines the surface appearance of the volume. When both 2D-mode data and Power mode data are displayed, the system always renders the 2D-mode data using the **Opaque** rendering method.



System Reference

Rendering methods	10-9
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To select a rendering method for the volume:

1. Select one or more data sets from **Display** on the 3-Scape Parameter menu on the **Compose** task card.
2. Select a rendering method from the **Rendering Mode** drop-down list on the 3-Scape Parameter menu.

Adjusting Opacity and Shading

The system applies the opacity settings for the **Surface Opacity** and **Surface Shading** rendering methods. The **Surface Shading** rendering method also uses shading (**Shading**). Opacity settings include low threshold, high threshold, opacity, and brightness. When 2D-mode data and Power mode data are both displayed, the shading and opacity settings affect the Power mode data only.

To adjust 2D-mode opacity and shading:

1. Select the volume quadrant.
2. If the volume includes Power mode data, then select **2D** from **Display** on the 3-Scape Parameter menu to limit display to 2D-mode data.
3. Select the 2D-mode priority mode indicator to display the settings for 2D-mode data.
4. Adjust the opacity and shading settings.

To adjust Power mode opacity and shading:

1. Select the volume quadrant.
2. Select **2D+C** or **C** from **Display** on the 3-Scape Parameter menu to include Power mode data in the display.
Note: The **C** selection is available only for the volume quadrant, when the selected rendering method is **Surface Opacity** or **Surface Shading**.
3. Select the Power mode priority mode indicator to display the settings for Power mode data.
4. Adjust the opacity and shading settings.

Post-Processing the Data

You can change the surface appearance of the volume and the slices by adjusting post-processing parameters. Each data set (2D-mode or Power mode) contains its own post-processing parameters listed on the 3-Scape Parameter menu on the **Compose** task card. 2D-mode parameters include maps, dynamic range, and tint; Power mode parameters include maps and priority.

The system applies changed post-processing parameters to the volume, slices, or all quadrants (volume and slices) depending on the selected rendering method.

- For **Slice** or **Opaque**, the system applies changed post-processing parameters to all quadrants.
- For **Surface Opacity** or **Surface Shading**, the system applies changed post-processing parameters to either the volume or all the slices, depending on the selected quadrant.

To adjust 2D-mode post-processing parameters:

1. If the rendering method is **Surface Opacity** or **Surface Shading**, then select one of the following:
 - The volume to apply changes to the volume quadrant
 - A slice to apply changes to all slice quadrants
2. If the volume quadrant is selected, then select **2D** from **Display** on the 3-Scape Parameter menu to limit display to 2D-mode data.
3. Select the 2D-mode priority mode indicator to display the settings for 2D-mode data.
4. Adjust the post-processing parameters.

To adjust Power mode post-processing parameters:

1. If the rendering method is **Surface Opacity** or **Surface Shading**, then select one of the following:
 - The volume to apply changes to the volume quadrant
 - A slice to apply changes to all slice quadrants
2. Select **2D+C** or **C** from **Display** on the 3-Scape Parameter menu to include Power mode data in the display.

Note: The **C** selection is available only for the volume quadrant, when the selected rendering method is **Surface Opacity** or **Surface Shading**.
3. Select the Power mode priority mode indicator to display the settings for Power mode data.
4. Adjust the post-processing parameters.



System Reference

3-Scape Parameter Menu	10-5
------------------------	------

Controlling the Plane Display in the Volume

The cut plane function can help you visualize the anatomy of interest in relation to the volume by controlling the plane display in the volume. This function can be helpful for visualization of anatomy that is not on the surface of the volume.

For example, select a slice quadrant and then locate an anatomy of interest that is not visible on the surface of the complete volume, such as a lesion. The lesion is not visible in the volume quadrant as the lesion is not located on the surface of the volume. Enable the cut plane function. The cut plane displayed in the volume quadrant matches the display of the most recently selected slice; the lesion is now visible in the volume quadrant. The amount of volume data behind the cut plane indicates the lesion's location in relation to the volume.

You can control the amount of 2D-mode data and/or Power mode data displayed in the volume by selecting a mode-specific cut plane function from the 3-Scape Parameter menu on the **Compose** task card. The cut plane function for 2D-mode data is **Plane**; the cut plane function for Power mode data is **C Plane**.

When you enable a cut plane function, the system removes all mode-specific volume data between the front surface of the volume (earliest acquired volume data) and the most recently selected slice (plane). The system continues to display the volume data that is behind the cut plane (the last acquired volume data). The cut plane matches the display of the most recently selected slice. The system uses a colored line on the reference orientation indicator (located on the lower left of the volume quadrant) to indicate the location of the cut plane. When the wireframe is enabled, the colored line is also displayed on the surface of the volume, within the wireframe.

Note: For an optimal view of the cut plane, you can rotate the volume or align the orientation of the volume with that of the selected slice.

To control the plane display in the volume:

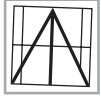
1. Select the priority mode indicator for either 2D-mode or Power mode.
2. To limit display of 2D-mode data, select **Plane** from the 3-Scape Parameter menu.
3. To limit display of Power mode data, select **C Plane** from the 3-Scape Parameter menu.



System Reference	
Rotating the Volume Reference orientation indicator	10-17
Aligning the orientation of the volume with that of the selected slice	10-21

Rotating the Volume

You can manually rotate the volume or enable automatic rotation of the volume. Rotation can help you visualize anatomic structure. You can also evaluate the image quality and assess potential smearing or artifacts.



The reference orientation indicator on the lower-left of the volume quadrant uses color to indicate the relative location of the data acquired first (the blue-colored portion) and the data acquired last (the red-colored portion).

Manual Rotation

You can use the **PRIORITY TOOL** key, **NEXT** key, and trackball to manually rotate the volume, or you can use the mode controls located on the control panel.

To rotate the volume using the mode controls:

1. Select the volume quadrant.
2. Rotate the mode control for the required axis of rotation:

Axis	Rotate
Axial	D control
Lateral	C control
Normal	2D control

To rotate the volume using the **PRIORITY TOOL** and **NEXT** keys:

1. Select the volume quadrant.
2. Press the **PRIORITY TOOL** key to select the **Volume** tool.
3. Press the **NEXT** key to cycle through the rotation and panning functions for the **Volume** tool; select a rotation function.

The system displays the graphic for the selected rotation function on the upper left of the quadrant.

4. Roll the trackball to rotate the volume around the axis.



Axial Axis of Rotation (volume) graphic.



Lateral Axis of Rotation (volume) graphic.



Normal Axis of Rotation (volume) graphic.

Enabling Automatic Rotation

During automatic rotation, the system rotates the volume using the selected automatic rotation settings. You can change the automatic rotation settings while the volume is rotating. The system dims selections on the 3-Scape Parameter menu that are not available during automatic rotation.

To enable automatic rotation for the volume:

1. Select the **Animation** group box on the lower left of the screen.
The system displays options on the **Animation** group box.
2. To change automatic rotation settings, select a rotation range, speed, and/or axis from the drop-down menus on the **Animation** group box.
3. Select the **Automatic Rotation** icon.



Automatic Rotation icon.

Panning the Volume

You can pan the volume if the volume is magnified. When the volume is panned, the display of the slices does not change. The volume does not display tick marks.



Panning graphic.

To pan the volume:

1. Select the volume quadrant.
2. Press the **ZOOM** key.
3. Press the **PRIORITY TOOL** key to select the **Volume** tool.
4. Press the **NEXT** key to cycle through the rotation and panning functions for the **Volume** tool; select the panning function.

The system displays the panning graphic on the upper left of the quadrant.

5. Roll the trackball to rotate the volume around the axis.

Stepping Through the Volume

You can traverse the active slice through the volume along the orthogonal axis. Traversing the slice is also called ***stepping through the volume***.

To step through the volume:

- Select a slice and then rotate the **CINE WHEEL**.

Removing Data from the Volume

You can remove data (voxels) to clarify anatomical structures. You can remove 2D-mode data and Power mode data separately or simultaneously. Use the 3-Scape Parameter Menu to enable or disable display of each data set (2D-mode data and/or Power mode data).

A **voxel** is the basic unit, or volume element, of 3-Scape data. Each point displayed in the volume quadrant represents a line through the volume, and each line in the volume quadrant represents a slice (plane).

You can choose from the following edits: polygon, parallel cut, or niche. You can also undo the previous edit or all edits. An edit consists of all the steps taken to complete a polygon, parallel cut, or niche.

Rotation of the volume may help you determine the type of edit required.

Polygon Edits

Polygon edits are traced shapes. You can remove the voxels from inside or outside the polygon. You can perform multiple polygon edits.

To perform a polygon edit on a volume:

1. Select the **Polygon** button from the **Editing** group box on the **Compose** task card.
The system changes the trackball cursor to an X and constrains the cursor to the volume quadrant.
2. Roll the trackball to position the X (cursor) at the starting point for the polygon edit and then press the **SELECT** key or the **NEXT** key to set the first point.
3. For each segment of the polygon trace, roll the trackball to position the X (cursor) at the end point and then press the **NEXT** key to set the end point.
The system uses the end point of the segment as the starting point for the next segment.
4. Press the **SELECT** key to complete the polygon trace. Alternatively, you can indicate completion of the polygon trace by positioning the current segment over an existing segment and then pressing the **NEXT** key to set the end point.
5. Select an area for removal:
 - To remove the area inside the polygon, roll the trackball to position the X (cursor) on the inside of the completed polygon trace and then press the **SELECT** key.
 - To remove the area outside the polygon, roll the trackball to position the X (cursor) on the outside of the completed polygon trace and then press the **SELECT** key.



System Reference

Rotating the
Volume 10-17



Polygon button.

Parallel Cut Edits

You can simultaneously perform multiple parallel cut edits. Voxels are removed from the area defined by the plane positions.

When the parallel cut edit tool is activated, the system displays the wireframe on the volume. The wireframe is a colored outline that indicates the boundaries of the volume.

To perform a parallel cut edit on a volume:

1. Select the **Parallel Cut** button from the **Editing** group box.
The system highlights the active plane on the wireframe (colored outline) displayed on the volume quadrant.
2. For each plane to be used in defining the parallel cut edit:
 - a. Roll the trackball to position the plane.
 - b. Press the **NEXT** key to set the plane position and select the next plane.
3. Press the **SELECT** key to complete the edit.



Parallel Cut button.

Niche Edits

You can perform one niche edit at a time. A niche edit is a cube-shaped edit. You can adjust all three planes simultaneously or individually.

To perform a niche edit on a volume:

1. Rotate the volume to position the area requiring editing in the front.
2. Select the **Niche** button from the **Editing** group box.
The system displays a cube outlined in green on the front corner of the volume. The cube represents the niche edit.
3. To simultaneously adjust the size of all planes of the cube, roll the trackball.
4. To resize one plane of the cube, press the **NEXT** key.
The system outlines the active plane of the cube in green and indicates the active plane with text to the right of the **NEXT** trackball status icon at the bottom of the screen.
5. Press the **SELECT** key to complete the edit.



Niche button.

Resetting Orientation

You can adjust the orientation of the volume and the slices using the **Reset** drop-down list on the 3-Scape Parameter menu.

When you center the slices, the system shifts each slice so that the marker is positioned in the center of the slice quadrant. For example, the marker is positioned to the upper left of a slice. When you center the slices, the system shifts the slice down and to the right, positioning the marker in the center of the slice quadrant.



System Reference

3-Scape Parameter Menu	10-8
------------------------	------

To:	Select the following option...
Center the slices	Center
Restore the default orientation for all quadrants	Reset Orientation
Restore the default orientation and display format plus the default (or user-defined) settings of other parameters for all quadrants	Reset All

To align the orientation of the slices with that of the volume:

- 1. Select the volume.
- 2. Select **Sync** from the **Reset** drop-down list on the 3-Scape Parameter menu.

To align the orientation of the volume with that of the selected slice:

- 1. Select a slice.
- 2. Select **Sync** from the **Reset** drop-down list on the 3-Scape Parameter menu.

Rotating the Slices

You can use the **NEXT** key and trackball to rotate the slices, or you can use the mode controls located on the control panel. When you rotate a slice, the system rotates all slices.

To rotate a slice using the mode controls:

1. Select a slice quadrant.
2. Rotate the mode control that applies to the required axis of rotation:

Axis	Rotate
Axial	D control
Lateral	C control
Normal	2D control



*Axial Axis of Rotation
(slice) graphic.*



*Lateral Axis of Rotation
(slice) graphic.*



*Normal Axis of Rotation
(slice) graphic.*

To rotate a slice using the NEXT key:

1. If the volume quadrant is selected, press the **PRIORITY TOOL** key to select the **Slice** tool.
2. Press the **NEXT** key on the control panel to cycle through the rotation and panning functions for the **Slice** tool; select a rotation function.

The system displays the graphic for the selected rotation function on the upper left of the quadrant.

3. Roll the trackball to rotate the slice around the axis.



Panning graphic.

Panning the Slices

When you pan a slice, the system shifts the tick marks along the edge of the slice and the marker within the slice in the panned direction. The marker indicates the point of intersection of the slices.



Panning graphic.

You can use the marker as an orientation guide to locate the anatomy of interest within a slice. When you reposition the marker as you pan the slice, the system automatically updates the other slices to display the corresponding views of the anatomy of interest.



Marker.

To pan across a slice:

1. Select a slice quadrant.
2. Press the **NEXT** key on the control panel to cycle through the rotation and panning functions; select the panning function.

The system displays the panning graphic on the upper left of the quadrant.

3. Roll the trackball to pan the marker (focal point) across the plane.

Magnifying Quadrants

You can magnify the selected quadrant using the **ZOOM** control. When you magnify a slice quadrant, the system also magnifies the other slice quadrants using the same zoom factor.

To magnify the selected quadrant:

- Press the **ZOOM** control and then rotate the control to adjust the zoom factor.

Storing, Printing, and Retrieving

You can store a volume acquired during an examination, store and print images of the volume, and retrieve volumes from previous examinations.

Storing the Volume

You can label and store the volume to the system's hard disk. The system adds a "3D" prefix to the specified label to facilitate identification of the related series object in the patient browser. The label is used as the "series description" for the series object containing the volume and all associated images.

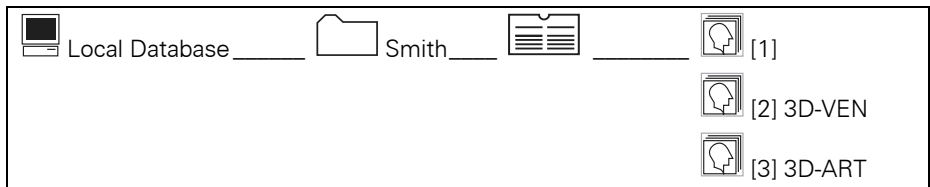
To store a volume:

Note: A volume can be stored only once.

1. Press the **CLIP/VOL SAVE** key on the control panel.
The system displays a dialog box requesting a volume label.
2. Use the keyboard to enter a label for the volume, and then select the **Enter** button in the dialog box (or press the **Enter** key on the keyboard).
The system stores a representative image of the volume in addition to the volume. While the volume is being stored, the system displays a progress bar.

Volumes and Series Objects

The system creates a new series object for each volume when you store the volume or when you print or store the first image of the volume. Study folders and series objects are visible in the patient browser.



Example of data displayed in patient browser for a patient "Smith". Each 3-Scape volume and its associated images are stored in a series object on the right.

Note: Because the patient browser includes both the volume and its representative image, the numbers of images listed for a (volume) series object in the patient browser is one more than that listed in the **Review** task card. The **Review** task card includes the representative image but not the volume.



System Reference

PATIENT DATA:	
Patient Browser	Ch 1
Series objects	Ch 1
Viewing Patient	
Data	Ch 1
Transferring Patient	
Data	Ch 1

Volumes and Additional Storage

Use the system presets to configure additional storage to occur during or after the examination (while the patient is registered). This configuration does not apply to the volume or its representative image. Neither the volume nor its representative image are stored to destinations (other than the compact disk) configured for additional storage. This configuration is used for all other images stored during the examination.

Use the patient browser to transfer volumes (and their representative images) to connected devices that support multi-frame images. Volumes are multi-frame images.

Storing and Printing Images

You can store and print images of the volume. Images stored or printed of the volume are single-frame images. All images stored and printed from a volume are stored as a screen capture format image on the system's hard disk. The system stores the images within the series object that contains the volume. Series objects are accessible from the patient browser.

Note: An image of the volume can be printed. The volume itself (all its multiple frames) cannot be printed.

Use the system presets to assign each key to print and/or store function(s).

Note: The system does not automatically store the volume when you print or store images. If you plan to retrieve the volume after the examination ends, store the volume.

To store or print an image:

- Press a **PRINT/STORE** key on the control panel that is configured for the storing or printing function.



Print/Store



Instructions for Use

Additional Storage Ch 4



Instructions for Use

Assigning functions to Print/Store Keys Ch 4
Choosing the Output Format for Images Ch 4



Print/Store



System Reference

PATIENT DATA:
Series objects Ch 1

Retrieving Volumes

You can retrieve and re-process volumes stored during the current examination or from previous examination(s). You can also store and print additional images.

When you load the study (or series object) containing the volume(s) from previous examination(s), the system initially displays all images in the **Review** task card. You can then select an image that is associated with a stored 3-Scape volume to retrieve and to view the volume in the **Compose** task card.



*A 3-Scape graphic is displayed on each image in the **Review** task card that is associated with a stored 3-Scape volume.*

To load images to the Review task card (from a previous examination):

1. Select the **Browser** key on the keyboard to access the patient browser.
2. Select the study folder (or series object) that contains the 3-Scape volume(s).
3. Select **Load to Review** from the **Patient** menu at the top of the patient browser.

The system displays the **Review** task card with images stored in the selected study folder or series object.

To retrieve a 3-Scape volume that is associated with an image in the Review task card (for the current examination or for a loaded previous examination):

- Select an image with a 3-Scape graphic from the **Review** task card, and then select the **Compose** task card tab at the bottom of the screen.

Note: Select a single image. The **Compose** task card is not available when multiple images are selected.

The system displays a progress bar during retrieval of the volume and then displays the associated volume in the **Compose** task card, using the default settings for the 3-Scape Parameter menu.



System Reference

PATIENT DATA:

Patient Browser	Ch 1
Review task card	Ch 1

Saving 3-Scape Settings for Later Patient Examinations

You can save 3-Scape settings from the **Compose** task card and retrieve them for later studies or examinations. To save these settings, create a user-defined exam type. The user-defined exam type automatically saves the rendering method, the **Wireframe** setting, and the following 3-Scape settings, as applied to the volume:



System Reference

IMAGE:
User-Defined
Exam Type Ch 2

2D-mode parameters	Power mode parameters
Plane	C Plane
Maps	Maps
Tint	Priority
DR	
Low Th	Low Th
High Th	High Th
Opacity	Opacity
Shading	Shading
Bright	Bright

Note: When 2D-mode data is displayed in addition to Power mode data and the selected rendering method is **Surface Opacity** or **Surface Shading**, the 2D-mode data of the volume uses the settings applied to the slices.

3-Scape Imaging ■ Technique Hints

This section includes information on how to obtain optimum 3-Scape images.

Adequate Gel

Apply a generous amount of coupling agent (gel) along the entire area to be scanned to avoid disrupting the scan sweep. Insufficient gel causes the transducer to drag on the skin during a linear scan.

Preview Sweep

Before acquiring a 3-Scape image, perform a preview scan of the anatomy in standard 2D-mode. To be sure you acquire a complete structure of interest, include some of the surroundings in the 2D-mode image.

Scan Speed

Scan at a constant rate. An irregular movement pattern may result in motion artifacts or distortions of the 3-Scape image.

Transducer

To ensure a constant elevation position during a linear scan, hold the transducer so that your little finger is in contact with the skin alongside the transducer face. This acts as a guide to ensure that the transducer is parallel to and in full contact (perpendicular) with the skin surface.

For a rocked scan, hold the transducer with both hands to ensure a steady, even scan motion.

1 Measurements and Calculations

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Measurement Function ■ Overview

The measurement function contains the measurements and calculations available for each study type and imaging mode. The study types are grouped with their related measurement labels, annotations, and pictograms into **applications**. You can select any application provided in the measurement function to use during a patient examination; the active application in the Measurement function does not change the study type selected in the **Patient Registration** form.

Use the measurement function during a patient study or on stored images.



System Reference

PATIENT DATA:	
VCR	Ch 2
Viewing images from previous examinations	Ch 1

Activating the Measurement Function

Measurements can be performed on real-time or frozen images. To activate the measurement function, select the **Calcs** task card tab at the bottom of the screen. Use the system presets to automatically activate the measurement function when you press the **FREEZE** key.

Measurements can also be performed on images retrieved from previous examinations (images must be stored in ultrasound format, not screen capture format). To activate the measurement function for a retrieved image, select the image in the **Review** task card and then select the **Calcs** task card tab at the bottom of the screen.



Basic system

Standard and Application-Specific Measurements

The ultrasound system contains measurements and calculations that are either **Standard** – the same for all study types – or **Application-specific** – particular to one study type. Calculations use formulas that require specific measurements. The system automatically performs a calculation when the required measurements have been completed.

Measurement Function

When the measurement function is activated, measurement-specific menus display on the left side of the screen, including measurement tools, labels, and pictograms. When the trackball cursor is positioned over the measurement menu, it displays as a pointer. When the trackball cursor is positioned over the image area, it displays as a measurement cursor. Values are displayed in Measured Results on the bottom of the screen as they are acquired. After labeled measurements are completed, Measured Results are transferred to the **Patient Report** for the application.

Mode Tabs

Mode tabs organize measurement methods or **measurement tools** by the active imaging mode. There is a tab for 2D-mode, Doppler, and M-mode.

Note: In addition to the measurement tools found on the Mode tabs, an additional Doppler tool, Auto Statistics, is found in the **Imaging** group box on the **Image** task card.

Selecting a Mode Tab

When the measurement function is activated, the system displays the mode tab for the priority imaging mode. A mode tab is selected with the Trackball/**SELECT** key or the **MENU** control.

Measurement Tools

Each mode tab displays the measurement methods available for the selected imaging mode as a measurement tool icon. Use system presets to select the default measurement method for Doppler and for each application.



System-wide
measurement tools




Basic Measurement Tools ■ 2D-Mode

Tool Icon	2D-Mode Measurements
	Distance
	Ellipse
	Trace

Basic Measurement Tools ■ Doppler

Tool Icon	Doppler Measurements
	Velocity/Frequency
	Heart Rate
	Trace
	RI-S/D (Resistive Index—Systolic/Diastolic)
	Slope
	Time
	Heart Cycle
	Velocity Ratio
	Auto Statistics (located in the Imaging group box on Image task card)

Basic Measurement Tools ■ M-Mode

Tool Icon	M-Mode Measurements
	Distance
	Heart Rate
	Slope

Compound Measurement Tools

Some measurements require more than one measurement to complete the measurement sequence. For example, Volume Flow requires a 2D-mode measurement to obtain the cross-sectional area of a blood vessel and a Doppler measurement to obtain the Time Averaged Velocity (TAV).

Imaging Mode	Compound Measurements
2D-mode	Stenosis, Volume, Volume Flow
Doppler	Volume Flow



System Reference

CALCS:

Basic

Measurements 1-5

Compound

Measurements 1-6

Selecting a Measurement Tool

A measurement tool is selected with the Trackball/**SELECT** key or the **MENU** control.

Measurement Label Menu

When the measurement function is activated, a Measurement Label menu displays on the left side of the image screen. The Measurement Label menu contains system-defined labels and any user-defined labels for the active application type and imaging mode.

Note: Labeling a measurement is required when transferring the results of a measurement or calculation to a patient report.

Labels indicate anatomical structures, views, and/or measurement types. Some measurement labels are organized in groups. For example, the **Abdominal** measurement labels are organized in the following groups: Anatomy, Venous, and Arterial. If an application has groups of measurement labels, these labels are accessed through drop-down menus.

The system provides a list of default measurement labels for each application. Use system presets to create or delete a user-defined measurement label. When measurement labels are user-defined, they are also displayed in the Measurement Label menu in the Custom group. Use system presets to customize the display of labels for each application and imaging mode.



Presets
Custom Meas. Labels
Meas. Labels Display

A checkbox next to the measurement label allows you to track measurements as they are completed.

Selecting a Measurement Label

A measurement label is selected with the Trackball/**SELECT** key or the **MENU** control.

Measurement Calipers

After activating the measurement function, use the trackball to position the measurement markers of a **caliper set** on the image screen.

Each set of measurement calipers displays unique beginning and ending points for each marker. The markers on the image match the markers displayed in Measured Results.



System Reference

CALCS:
Activating the
measurement
function

1-3

Positioning and Anchoring Calipers

Position a measurement marker by rolling the trackball. An active marker is green. Anchor a marker by pressing the **SELECT** key. Position the second marker by rolling the trackball; the system automatically updates the value of the measurement in Measured Results.

Before completing the measurement, you can reposition the end points of the measurement markers by pressing the **NEXT** key, and then rolling the trackball to adjust the end points.

When the measurement is satisfactory, press the **SELECT** key to complete the measurement. The value is displayed in Measured Results. If the measurement is labeled, the value is transferred to the patient report.

To readjust a measurement marker after the measurement is completed, press the **PRIORITY TOOL** key to cycle through the on-screen measurements. The active measurement is green. When the marker is active, press the **NEXT** key. The measurement marker can be adjusted using the trackball. The measurement value is automatically updated in Measured Results and, if labeled, in the patient report.

Summary ■ Positioning and Anchoring Calipers

To	Perform this action
Anchor a marker.	Press the SELECT key.
Toggle markers, before completing a measurement	Press the NEXT key. This allows the trackball to control the other measurement marker. Roll the trackball to reposition the marker.
Complete a measurement	Press the SELECT key.
Make another measurement	Reposition the caliper and press the SELECT key.
Readjust a measurement marker of a completed measurement	Press the PRIORITY TOOL key. This cycles through the on-screen measurement markers. When the measurement marker is active, press NEXT key to activate the end point you want to adjust. Roll the trackball to reposition the measurement marker. Then press the SELECT key to complete the measurement.

Positioning and Anchoring Calipers in Dual and Seamless Dual Formats

You can start a measurement in a Dual or Seamless Dual image and finish it outside the image or in the next image. Position and anchor the calipers in the same way you would for a 2D-mode image.

You can perform a measurement across the boundaries of Dual or Seamless Dual images even if there is a gap between the images or if one of the images is zoomed and the other is not. However, the measured values are estimates. You can reposition the calipers, but you cannot move the first caliper into the second image.

Label then Measure

To include a measured value in a patient report, a label must be assigned to the value.

To label then measure:

1. Select the desired label in the Measurement Label menu.

The system activates the default measurement method for the selected label.

2. Complete the measurement using the default measurement method or select any other available measurement method.

The system assigns the measured result to the selected label. When the measurement is complete, an "x" displays in the box next to the label. This helps you track completed measurements.

Measured Results

Values from measurements and calculations display in Measured Results on the bottom of the screen.

Abbreviations of Measured Results

2D-Mode	Unit	Abbreviation
Distance, diameter or circumference	millimeters	mm
Area	centimeters ²	cm ²
Volume, one or two-plane	cubic centimeters	cm ³
Volume, residual urine	milliliter	ml
Volume Flow*	liters per minute	l/m
%Stenosis	percent	%

*Also requires Doppler measurement.

Doppler	Unit	Abbreviation
Velocity or frequency	centimeters per second or kilohertz	cm/s or kHz
Heart rate	beats per minutes	bpm
Time	seconds	s
Slope	centimeters per second squared or kilohertz per second	cm/s ² or kHz/s
Systole, peak	centimeters per second or kilohertz	cm/s or kHz
Diastole, minimum	centimeters per second or kilohertz	cm/s or kHz
Time average velocity	centimeters per second or kilohertz	cm/s or kHz
Volume Flow*	liters per minute	l/m
Pressure, mean or peak	millimeters mercury	mm Hg

*Also requires 2D-mode measurement.

M-mode	Unit	Abbreviation
Distance	millimeters	mm
Heart rate	beats per minutes	bpm
Time	seconds	s
Slope	millimeters per second	mm/s

Deleting a Completed Measurement

If more than one measurement has been performed, the **UNIVERSAL 1** control deletes the measurements in the order of the last measurement completed.

You can use the **UNIVERSAL 2** control during the creation of a trace to undo segments of the trace in reverse of the sequence it was created, one step at a time.

Note: This does not delete saved measurements in the patient report.

Patient Reports

The system transfers labeled measurements and calculations from Measured Results to the patient report. The contents of the patient report are arranged by patient information and by the application-specific measurements for a patient study. To view patient information or to display measurements from a specific study, make your selection from the menu on the left of the patient report screen.

The measurements for a patient study are arranged by the types of measurement labels (for example the Abdominal application has Anatomy, Arterial, and Venous labels). The system adds a section to the patient report when the first labeled measurement is completed for a type of label.

The boxes that contain the measurement information can be maximized and minimized by clicking the button in the upper right corner of the report section.

The system also transfers information from the **Patient Registration** form into the **Patient Report**, including: the patient's name, identification number, date of birth, age, gender, height and weight, blood pressure, study type, and study date, and information about the institution and physicians.



Instructions for Use

Patient Registration
form Ch 5

Accessing a Patient Report

A patient report for the current examination can be viewed at any time during the patient examination or after the report is saved.

To access a patient report:

1. Press the **Report** key located on the keyboard or select the **Report** icon at the bottom of the image screen after completing the labeled measurement.

The system displays the patient report.

2. If the patient report has more content than can be viewed on one screen, use the scroll bar to move the content of the screen up or down.
3. To expand or close a section of the report, roll the trackball to the maximize/minimize icon at the right side of the report page and then press the **SELECT** key.

To exit the patient report:

- Press the **Report** key on the keyboard
- Select the **Report** icon at the bottom of the image screen
- Roll the trackball to the "X" at the upper right of the report screen and then press the **SELECT** key.

Printing and Storing the Patient Report

Patient reports are stored as images (screenshots). You can print either the displayed portion or all portions of the patient report.

To print the entire contents of the patient report:

Note: The **Print Report** button on the lower left of the **Patient Report** screen is available for systems connected to a supported laser printer only.

- Select the **Print Report** button on the lower left of the **Patient Report** screen.

The system sends all portions of the patient report to the connected laser printer.

To print the patient report as a screenshot (displayed portion only):

- Press the **PRINT/STORE** key assigned to the printing function.

The system sends a request for the displayed portion of the patient report to the printer configured for miscellaneous images. The system also stores the patient report as an image (screenshot) to the local database.



Instructions for Use

Print/Store setup Ch 4

To store the displayed patient report (displayed portion only):

- Press the **PRINT/STORE** key assigned to the storing function.

The system stores the patient report as an image (screenshot) to the local database.

Annotations and Pictograms

There are two ways you can annotate a screen image: with text and with graphics. The text, termed **annotations**, are either system-defined or a direct user entry from the keyboard. You can use system presets to edit application-specific text lists. Graphical annotations, termed **pictograms**, are system-defined. Arrows are also available for image annotation.



**Annotations
and Pictograms**

Annotations

Application-specific **Annotations** allow you to directly enter text or insert text using the keyboard. You can also hide text if you do not want it to display in print, film, or on the screen. The default insertion point for annotation text is at the Home position.



Instructions for Use

Keyboard

Ch 3

To position the insertion point:

- Use the arrow keys on the keyboard
- Press the **Annotation Cursor** key on the keyboard and then roll the trackball to reposition the cursor. To return trackball control to the measurement function, press the **Annotation Cursor** key a second time.



**Annotation Cursor
key.**

To enter text on the screen:

1. Position the insertion point where you want the text to display.
The system displays a cursor on the screen.
2. To enter a system-defined anatomy term, press the **Text A, B, C,** or **D** key on the keyboard until the term displays on the screen.
3. To enter text, use the keyboard. As you enter letters, the system will suggest a matching phrase from the application-specific text library. Continue typing, or press the **Tab** key on the keyboard to accept the suggested text.

To hide text:

- Press the **Hide Text** key on the keyboard; press again to redisplay the text.

To delete text from the screen:

- Position the insertion point behind the text and press the **Backspace** key on the keyboard to delete letters.
- Position the insertion point in a line of text and press the **Clear Line** key on the keyboard to delete the line.

To remove all annotations, pictograms, and transducer markers from the screen:

- Press the **Clear Screen** key on the keyboard.
- Register a new patient or begin a new study.
- Change the transducer or the exam type.
- In Review, press the **End Exam** button.

Pictograms

The pictogram function allows you to place a pictogram on the screen and to place a marker to indicate the position of the transducer. Pictograms are application-specific.

To insert a pictogram onto the screen:

1. Press the **Picto** key on the keyboard, or when the **Calcs** task card is active, select the **Pictogram** button from the **Pictogram** group box.
The system displays the first available pictogram for the currently active application, and a marker indicating the position of the transducer.
2. To view other available pictograms for the active application, press the arrow keys on the keyboard or, with the **Pictogram** button selected from the **Pictogram** group box, rotate the **MENU** control. Continue until the required pictogram is displayed.
The pictogram displays on the screen.
3. Roll the trackball to position or rotate the transducer marker. Press the **NEXT** key to toggle the **Position** and **Rotating** functions for the marker.
4. Press the **SELECT** key to anchor the transducer marker and disengage the trackball.



Picto key.



Group Box icon for Pictogram

To hide a transducer marker:

- Press the **Marker** key on the keyboard. Press again to re-display the marker. In the Calcs task card, you can click the Transducer Marker icon.



Marker key.

To delete a pictogram from the screen:

- Select the **Delete Current Pictogram** button from the **Pictogram** group box located on the **Calcs** task card.

The system removes the pictogram from the screen.

- Press the **Clear Screen** key on the keyboard.

The system removes the pictogram and any annotations from the screen.



Group Box icon for Transducer Marker



Group Box icon for Delete Pictogram

Arrows

To position an arrow on the screen:

1. Press the **Arrow** key on the keyboard.
A green arrow displays on the screen.
2. Roll the trackball to position or rotate the arrow. Press the **NEXT** key to toggle the **Position** and **Rotating** functions for the arrow.
3. Press the **SELECT** key to anchor the arrow and disengage the trackball.



Arrow key.

Customizing Measurements and Reports

Use system presets to customize measurements and reports, including 2D-mode tools, Doppler tools, and user-defined measurement labels. Some presets are specific to a particular application, while other presets pertain to all applications.

Customizing Measurement Tools

Use system presets to select the default tools for use during the measurement function in 2D-mode and in Doppler. The system preset that determines the number of cycles to use when measuring heart rate is not mode-specific, it applies to the entire system.

2D-mode selections are available for you to customize the:

- Default tool to use for volume measurements for each application type
- Default tool to use for stenosis measurements for each application type
- Default tool to use for Obstetrical circumference measurements (ellipse or trace)

Doppler selections are available for you to customize the:

- Default Doppler measurement tool for each application type
- Heart Cycle/Trace values to display in Measured Results and the patient report
- Resistive Index values to display in Measured Results and the patient report
- Default measurement method for Volume Flow
- Doppler Ratio measurement to use for selected applications



System Reference

RESOURCES:

System Presets Ch 1



**System-wide
measurement tools
2D-mode
measurement tools
Doppler
measurement tools**

Creating User-Defined Labels

Create Custom Labels allow you to:

- Create user-defined measurement labels
- Define the imaging mode, tool, and report group for each user-defined label
- Delete user-defined measurement labels

Customizing Reports

Measurement Report Settings allow you to:

- Select the measurement value display method: mean of measurements or most recent measurement
- Customize the display of measurement labels for each application and imaging mode
- Choose application-specific settings for the Pediatrics and Urology reports
- Select the display of Obstetrical ratios and calculations, and create gestational age tables in Obstetrical reports

Exiting the Measurement Function

To exit the measurement function, activate an imaging mode.

Basic Measurement Tools

When measurements are completed using a single tool, the measurement is referred to as a ***basic measurement***. If a measurement requires the use of more than one imaging mode or tool, it is referred to as a ***compound measurement***.

Basic 2D-Mode Measurements and Calculations

Basic 2D-mode measurement tools include:

- Distance
- Ellipse
- Trace

Using the Distance Tool

Use the **Distance** tool to calculate the length of a straight line between two markers.

To make a distance measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Distance** tool from the 2D-mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the first marker.

4. Roll the trackball to position the second measurement marker.

The system automatically updates the measured distance.

5. To complete the measurement, press the **SELECT** key.

The measured distance displays in Measured Results. When assigned a label, the system transfers the value to the patient report.



Distance tool.

Using the Ellipse Tool

The **Ellipse** tool is used to determine circumference and area.

To make an ellipse measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Ellipse** tool from the 2D-mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the marker, displays an ellipse, and displays the diameter in Measured Results.

4. Roll the trackball to adjust the axis and then press the **NEXT** key.

The system displays the area (**A**), circumference (**C**), and diameter (**D**) values in Measured Results.

5. Roll the trackball to adjust the shape of the ellipse along the second axis and then press the **SELECT** key to complete the ellipse measurement.

The area, circumference, and diameter measurements display in Measured Results. When assigned a label, the system transfers the values to the patient report.



Ellipse tool.

Note: Before the ellipse is anchored on the image, you can reposition an axis endpoint. Press the **NEXT** key to activate the desired marker, and then roll the trackball to adjust the ellipse.

Using the Trace Tool

The Trace tool is used manually to determine the circumference of a structure. You should not expect circumference computations based on manual tracing to be highly accurate. Circumference accuracy for the trace tool is largely dependent on the user because of an individual's incremental movements using the trackball. Therefore, tolerances on circumference measurements cannot be guaranteed when using the manual tool.

The system calculates the area inside the trace.

You can use the **UNIVERSAL 2** control during the creation of a trace to undo segments of the trace in the sequence it was created, one step at a time.

To perform a trace measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Trace** tool from the 2D-mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the marker.

4. Roll the trackball to create a trace of the structure.

The distance displays in Measured Results.

5. To complete the trace, press the **SELECT** key.

The system displays the area (**A**) and circumference (**C**) of the traced structure in Measured Results. When assigned a label, the system transfers the values to the patient report.

Basic Doppler Measurements and Calculations

Basic Doppler measurement tools include:

- Velocity/Frequency
- Heart Rate
- Trace
- RI-S/D (Resistive Index – Systolic/Diastolic)
- Slope
- Time
- Heart Cycle
- Velocity Ratio
- Auto statistics On/Off (located in the Imaging drop-down box on the **Image** task card)

Using the Velocity/Frequency Tool

Use the **Velocity/Frequency** tool to calculate a velocity or frequency, depending on the Doppler-mode and scale selection. Velocity or frequency can be measured either when the image is real-time or frozen.

Select the display of Velocity or Frequency using system presets.

To measure velocity or frequency:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Velocity** tool from the Doppler mode tab.
3. Roll the trackball to position the measurement marker both vertically and horizontally and then press the **SELECT** key.

The system calculates the velocity or frequency, and then displays the values in Measured Results. When assigned a label, the system transfers the measured values to the patient report.

When the Doppler angle is changed, the velocity or frequency value is updated automatically.



**Doppler
measurement tools**



Velocity tool.

Using the Heart Rate Tool

Use the **Heart Rate** tool to determine the heart rate by using two vertical lines to define the number of heart cycles specified in system presets for all applications.



**System-wide
measurement tools**

To measure heart rate:

1. Activate the measurement function.
2. Select the **Heart Rate** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker in the spectrum at the beginning of the cardiac cycle.

A system message displays with the number of heart cycles to include in the measurement.

4. Press the **SELECT** key.

The system anchors the marker.

5. Roll the trackball to position the second measurement marker at the end of the appropriate number of cardiac cycles and then press the **SELECT** key.

The system displays the heart rate and time in Measured Results and transfers the heart rate value to the patient report.



Heart Rate tool.

Using the Trace Tool

Use the **Trace** tool to perform a manual waveform trace. Use system presets to select the values to be displayed in Measured Results. These values may include: Peak Systole (PS), End Diastole (ED), Time Averaged Velocity (TAV), Pulsatility Index (PI), Resistive Index (RI), and Systolic/Diastolic (S/D).



**Doppler
measurement tools**

You can use the **Universal 2** control during the creation of a trace to undo segments of the trace in the sequence it was created, one step at a time.

To perform a trace measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 2.

1. Activate the measurement function.
2. Select the **Trace** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker both vertically and horizontally and then press the **SELECT** key.



Trace tool.

The system anchors the marker to indicate the starting position of the trace and displays a second marker for you to create the trace.

4. Roll the trackball to create a trace of the structure and then press the **SELECT** key.

The system anchors the marker to indicate the ending position of the trace and displays markers on the traced waveform to indicate the peak systole and end diastole.

5. To reposition the markers indicating peak systole and end diastole, press the **NEXT** key and then roll the trackball.

Each press of the **NEXT** key toggles the peak systole (**PS**) marker with the end diastole (**ED**) marker. The name of the active marker (**PS** or **ED**) is indicated by the **Next** icon on the lower right of the screen.

6. Press the **SELECT** key to conclude the measurement.

The system completes the measurement, and then displays the values in Measured Results. When assigned a label, the system transfers the measured values to the patient report.

Using the Resistive Index – Systolic/Diastolic Tool

Use the **RI-S/D** tool to calculate the resistance index.

To calculate the resistance index:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **RI-S/D** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker on peak systole and then press the **SELECT** key.

The system anchors the marker and displays the values for the resistance index (RI), peak systole (PS), end diastole (ED), and systole/diastole (S/D) in Measured Results.

4. Roll the trackball to position the second measurement marker on end diastole and then press the **SELECT** key.

The system updates the values for the resistance index (RI), peak systole (PS), end diastole (ED), and systole/diastole (S/D). When assigned a label, the system transfers the values to the patient report.



**Doppler
measurement tools**



RI-S/D tool.

Using the Slope Tool

Use the **Slope** tool to measure acceleration or deceleration of speed over time.

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

To make a Slope measurement:

1. Activate the measurement function.
2. Select the **Slope** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker at the beginning of the slope and then press the **SELECT** key.

The system anchors the marker. The system updates the acceleration or deceleration values as the trackball is moved and displays the value in Measured Results.

4. Roll the trackball to position the second measurement marker to the right of the first marker, at the end of the slope you are measuring and then press the **SELECT** key.

When assigned a label, the system transfers the values to the patient report.



Slope tool.

Using the Time Tool

Use the **Time** tool to measure time between two measurement markers.

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

To make a Time measurement:

1. Activate the measurement function.
2. Select the **Time** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker at the beginning and then press the **SELECT** key.



Time tool.

The system anchors the marker. The system updates the time value as the trackball is moved and displays the value in Measured Results.

4. Roll the trackball to position the second measurement marker to the right of the first marker, at the end of the duration you are measuring, and then press the **SELECT** key.

When assigned a label, the system transfers the values to the patient report.

Using the Heart Cycle Tool

Use the **Heart Cycle** tool to measure the heart cycle.

Use system presets to select the values to be displayed in Measured Results. These values may include: Peak Systole (PS), End Diastole (ED), Time Averaged Velocity (TAV), Pulsatility Index (PI), Resistive Index (RI), and Systolic/Diastolic (S/D).

Use the **Above/Below Baseline** button (located in the **Imaging** group box on the **Image** task card) to select the display of Doppler data for the Auto Statistics tool or for the Heart Cycle tool. Select one of the following options:

- Use data both above and below the baseline.
- Use only data above the baseline.
- Use only data below the baseline.

To perform a heart cycle measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Heart Cycle** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the marker.

4. Roll the trackball to position the second measurement marker and then press the **SELECT** key.

The system creates a trace of the structure from the first measurement marker to the second measurement marker. The system then displays selected values of the traced structure in Measured Results.

5. To reposition the markers indicating peak systole and end diastole, press the **NEXT** key and then roll the trackball.

Each press of the **NEXT** key toggles the peak systole (**PS**) marker with the end diastole (**ED**) marker. The name of the active marker (**PS** or **ED**) is indicated by the Next icon on the lower right of the screen.

6. Press the **SELECT** key to conclude the measurement.

The system completes the measurement, and then displays the values in Measured Results. When assigned a label, the system transfers the measured values to the patient report.



**Doppler
measurement tools**



**Above/Below
Baseline button.**



Heart Cycle tool.

Using the Velocity Ratio Tool

The **Velocity Ratio** tool allows you to place two velocity markers to calculate the velocity ratio.

To calculate the Velocity Ratio:

1. Active the measurement function.
2. Select the **Velocity Ratio** tool from the Doppler mode tab.
3. Roll the trackball to position the first measurement marker, and then press the **SELECT** key.
4. Roll the trackball to position the second measurement marker, and then press the **SELECT** key.

The system calculates the ratio and displays the first and second velocities (**V1** and **V2**) and the ratio in Measured Results.



Velocity Ratio tool.

Using the Auto Statistics Tool

The **Auto Statistics** tool is located in the **Imaging** group box on the **Image** task card.

Use Auto Statistics to activate or deactivate the display of Doppler statistics. This information is not saved to the patient report.

Use the **Above/Below Baseline** button (located in the **Imaging** group box on the **Image** task card) to select the display of Doppler data for the Auto Statistics tool or for the Heart Cycle tool. Select one of the following options:

- Use data both above and below the baseline.
- Use only data above the baseline.
- Use only data below the baseline.

Activating Auto Statistics

To activate the display of Doppler statistics:

1. Open the **Image** task card, and then activate Doppler mode.
2. Select the **Auto Stats** button.
A window displays with two options: turn on or turn off auto stats.
3. Select **Turn ON Auto Stats**.
4. To deactivate **Auto Stats**, select **Turn OFF Auto Stats**.



Doppler measurement tools



Above/Below Baseline button.



Auto Stats button.



System Reference

Doppler functions Ch 4

Basic M-Mode Measurements and Calculations

Basic M-mode measurement tools include:

- Distance
- Heart Rate
- Slope

Using the Distance Tool

Use the **Distance** tool to calculate the length of a straight line between two vertical caliper markers.

To make a distance measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Distance** tool from the M-mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the marker.

4. Roll the trackball to position the second measurement marker and then press the **SELECT** key to complete the measurement.

The system automatically updates the distance (**D**) measurement in Measured Results. When assigned a label, the system transfers the values to the patient report.



Distance tool.

Using the Slope Tool

The **Slope** tool measures the change in distance over time, as determined by two distance measurement markers.

To make a slope measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Slope** tool from the M-mode tab.
3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.



Slope tool.

The system anchors the marker and displays the second marker. When assigned a label, the system transfers the values to the patient report.

4. Roll the trackball to position the second measurement marker to the right of the first marker and then press the **SELECT** key.

For the slope measurement, the system displays the slope, time (**T**) and distance (**D**) in Measured Results. When assigned a label, the system transfers the values to the patient report.

Using the Heart Rate Tool

Use the **Heart Rate** tool to determine the heart rate by using two vertical lines to define the number of heart cycles specified in system presets for all applications.



**System-wide
measurement tools**

To make a heart rate measurement:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 3.

1. Activate the measurement function.
2. Select the **Heart Rate** tool from the M-mode tab.
The system displays the first measurement marker.
3. Roll the trackball to position the marker at the beginning of the cardiac cycle and then press the **SELECT** key.

The system anchors the marker. A system message displays with the number of heart cycles to include in the measurement.

4. Roll the trackball to position the second measurement marker at the end of the appropriate number of cardiac cycles and then press the **SELECT** key.

As the marker is moved, the system updates the heart rate (**HR**) and time (**T**) in Measured Results. The system transfers the heart rate value to the patient report.



Heart Rate tool.

Compound Measurement Tools

Compound measurements are measurements that require more than one imaging mode, more than one image, or more than one measurement tool to complete the measurement. Some compound measurements involve making multiple measurements on one image. Other measurements involve measurements on multiple images.

Compound measurements can be done in any order. For example, if you are using a compound tool that requires a distance measurement and an ellipse measurement, you can perform either the distance or the ellipse measurement first. You can also perform one of the compound measurements, and then perform measurements unrelated to the compound measurement as long as you complete the compound measurement before selecting another compound measurement tool.

Select compound measurements from the Compound Measurement Tool drop-down box on the mode tab. Compound measurement selections include:

- Volume
- Volume Flow
- Stenosis

Using the Volume Tool

Use the **Volume** tool to measure volume. Volume measurements can be made on single and dual 2D images. Except for thyroid volume, the system uses the following formula to calculate the volume:

$$\text{Volume} = (\pi/6) \times D1 \times D2 \times D3$$

where D1, D2, and D3 are the three diameters of the ellipsoid.

When the **Volume** tool is selected, you can measure a volume using one of the three methods selected for the application in system presets:

- Three distance measurements
- One ellipse measurement and one distance measurement
- One distance measurement

To calculate a volume:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 2.

1. Activate the measurement function.
2. Select the **Volume** tool from the Compound Measurement Tool drop-down box on the Mode tab.
The system displays the first measurement marker.
3. Measure the volume using the method selected in system presets.
4. To complete the measurement, press the **SELECT** key. The measured volume displays in Measured Results. When assigned a label, the system transfers the values to the patient report.



System Reference

CALCS:	
Distance Tool	1-28
Trace Tool	1-19
Ellipse Tool	1-18



2D-mode measurement tools

Using the Volume Flow Tool

The **Volume Flow** tool is available in both 2D-mode and Doppler. When the volume flow tool is selected, you can measure volume flow using one of two methods selected in system presets:

- One velocity measurement (Doppler) and one distance measurement (2D)
- One velocity measurement (Doppler) and one ellipse measurement (2D)

To calculate a volume flow:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 2.

1. Activate the measurement function.
2. Select the **Volume Flow** tool from the Compound Measurement Tool drop-down box on the mode tab.
The system displays the first measurement marker.
3. Measure the volume flow using the method selected in system presets.
4. To complete the measurement, press the **SELECT** key. The measured volume flow displays in Measured Results. When assigned a label, the system transfers the values to the patient report.



System Reference

CALCS:	
Distance Tool	1-17
Trace Tool	1-22
Ellipse Tool	1-18
Velocity Tool	1-26



Doppler measurement tools

Volume Flow

Volume Flow
tool.

Using the Stenosis Tool

The **Stenosis** tool is available in 2D-mode. When the **Stenosis** tool is selected, you can measure stenosis using one of two methods selected in system presets:

- Two ellipse measurements
- Two distance measurements

To calculate a stenosis:

Note: To include a measured value in a patient report, a label must be assigned to the value. If you want to include the measured value in a patient report, first select the label and then proceed to step 2.

1. Activate the measurement function.
2. Select the **Stenosis** tool from Compound Measurement Tool drop-down box on the Mode tab.
The system displays the first measurement marker.
3. Measure the volume using the method selected in system presets.
4. To complete the measurement, press the **SELECT** key. The measured stenosis displays in Measured Results. When assigned a label, the system transfers the values to the patient report.



2D-mode measurement tools

Stenosis

Stenosis tool.

2 Application-Specific Measurements and Calculations

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Application-Specific Measurements and Calculations ■ Overview

The measurement function provides measurements and calculations designed to address the requirements of specific areas of clinical focus. Basic and compound measurement tools are used to perform these calculations. For each application, the system provides:

- Measurement labels and calculations
- Annotations and pictograms
- Patient report for all labeled measurements
- Customization of exams, calculations, and reports.



System Reference

CALCS:	
Basic	
Measurements	Ch 1
Compound	
Measurements	Ch 1
Obstetric	
Measurements,	
Calculations,	
and Reports	Ch 3

Application-Specific Measurement Labels

System-defined measurement labels are available for the following:

- Abdomen
- Cerebrovascular (CV)
- Renal
- Transcranial Doppler (TCD)
- Breast
- Peripheral Vascular – Arterial (PV-Art)
- Gynecology (GYN)
- Peripheral Vascular – Venous (PV-Ven)
- Obstetrics (OB)
- Pediatric
- Testis
- Neonatal Head
- Thyroid
- Fetal Echo
- Musculoskeletal (MSK)
- Pelvis
- Superficial Musculoskeletal (Sup MSK)
- Penile
- Digital
- Prostate

Additional Labels

Additional labels are available where appropriate for Right, Middle, Left, Proximal, Middle, and Distal; and A, B, C, and D labels for multiple gestations. These labels are used in combination with measurement labels and are found on the Measurement menu.

For example, to measure the right kidney select the **R** (right) label before selecting the label for kidney. When you complete the measurement of the right kidney, an "x" displays in the box next to the kidney label. To measure the left kidney, select the **L** (left) label, and then select the kidney label. Once the measurement is complete, an "x" displays in the box next to the kidney label, this time indicating the left kidney.

Measurements for both the right and the left kidneys display in Measured Results, and the values are transferred to the patient report.

Abdomen

Abdomen measurement labels are organized into the following groups:

- Anatomy
- Venous
- Arterial

Additional labels are available to indicate the view of the anatomy: right, left; and proximal, middle, and distal.

Abdominal Anatomy Measurement Labels

▪ 2D-Mode

Abdominal Structure Measurement Label	2D-Mode Measurement Tool
Liver	Distance Volume
CHD (Common Hepatic Duct)	Distance
CBD (Common Bile Duct)	Distance
GB Wall (Gall Bladder Wall)	Distance
Panc Duct (Pancreatic Duct)	Distance
Spleen	Distance Volume
Kidney	Distance Volume
PreVoid Bld (Bladder)	Volume
PostVoid Bld (Bladder)	Volume

Abdominal Venous Measurement Labels

■ 2D-Mode and Doppler

Abdominal Venous Measurement Label	2D-Mode Measurement	Doppler Measurement
IVC (Inferior Vena Cava))	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Portal V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Hepatic V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
SMV (Superior Mesenteric Vein))	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Renal V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Splenic V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Iliac V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Anast V (Anastomosis Vein))	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Abdominal Arterial Measurement Labels

■ 2D-Mode and Doppler

Abdominal Arterial Measurement Label	2D-Mode Measurement	Doppler Measurement
Aorta	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Celiac A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Splenic A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Gastric A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Hepatic A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
SMA (Superior Mesenteric Artery)	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Renal A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
IMA (Inferior Mesenteric Artery)	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Abdominal Arterial Measurement Label	2D-Mode Measurement	Doppler Measurement
Bifurcation	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Iliac A	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
AnastA (Anastomosis Artery)	Distance Volume Flow Stenosis	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Abdominal Pictograms



Liver



Pancreas



Spleen



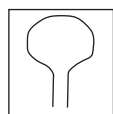
Biliary



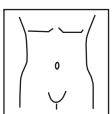
Right Kidney



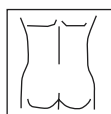
Left Kidney



Bladder



Supine



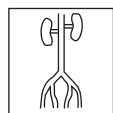
Prone



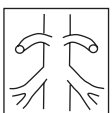
Right Decubitus



Left Decubitus



Aorta



Aorta, superior

Renal

Renal measurement labels are organized into the following groups:

- Anatomy
- Vessels

Additional labels are available to indicate view: right, left; and proximal, middle, and distal.

Renal Anatomy Measurement Labels ▪ 2D-Mode

Renal Structure Measurement Label	2D-Mode Measurement Tool
Kidney	Distance Volume
Ureter	Distance
PreVoid Bld (Bladder)	Volume
PostVoid Bld (Bladder)	Volume

Renal Vessels Measurement Labels ▪ 2D-Mode and Doppler

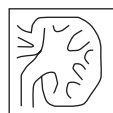
Renal Blood Vessel Measurement Label	2D-Mode Measurement	Default Doppler Measurement
Aorta	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
IVC (Inferior Vena Cava))	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Renal A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Renal V	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Renal Blood Vessel Measurement Label	2D-Mode Measurement	Default Doppler Measurement
Segmental A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Interlobar A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Arcuate A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Anast A (Anastomosis Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Anast V (Anastomosis Vein)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

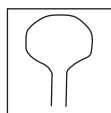
Renal Pictograms



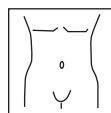
Right Kidney



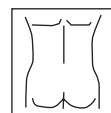
Left Kidney



Bladder



Supine



Prone



Right Decubitus



Left Decubitus

Breast

The breast measurement labels provide for measurement of three masses for each breast. Prefix labels are available to indicate left and right, as well as pictograms that can be used to identify the location of the masses.

You can use the 2D-mode **Distance** tool to measure breast masses.

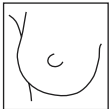
Breast Pictograms



Right Breast
Sagittal



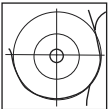
Left Breast
Sagittal



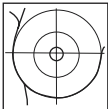
Right Axilla
and Breast



Left Axilla
and Breast



Left Breast
with graphics



Right Breast
with graphics

Gynecology

Gynecology measurement labels are organized into the following groups:

- Structure
- Arterial
- Cyst
- Follicle

Additional labels are available to indicate right and left.

Gynecology Structure Measurement Labels

▪ 2D-Mode

GYN 2D-Mode Structure Measurement Label	Measurement Tool
Kidney	Distance Volume
Uterus	Distance Volume
Ovary	Distance Volume
Endomet	Distance
PreVoid Bladder	Volume
PostVoid Bladder	Volume

Gynecology Arterial Measurement Labels

▪ 2D-Mode and Doppler

GYN Doppler Measurement Label	2D-Mode Measurement Tool	Doppler Measurement Tool
Arcuate A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Ovarian A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Uterine A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Gynecology Cyst Measurement Labels

■ 2D-Mode

There are measurement labels for up to six cysts in the Gynecology Measurement Labels. You can use 2D-mode **Distance** or **Volume** tools to measure cysts.

Gynecology Follicle Measurement Labels

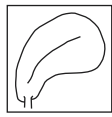
■ 2D-Mode

There are measurement labels for up to six follicles in the Gynecology Measurement Labels. You can use 2D-mode **Distance** tools to measure follicles.

Gynecology Pictograms



Coronal Uterus



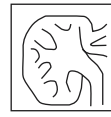
Sagittal Uterus



Right Ovary



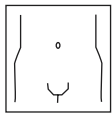
Left Ovary



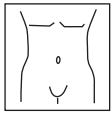
Right Kidney



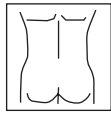
Left Kidney



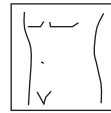
Groin



Supine



Prone



Right Decubitus



Left Decubitus

Testis

Testis measurement labels are organized into the following groups:

- Anatomy
- Vessels

Additional labels are available to indicate left and right.

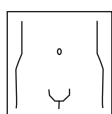
Testis Anatomy Measurement Labels ▪ 2D-Mode

Testis Measurement Label	Measurement Tool
Testicle	Distance, Volume
Epididymis	Distance
Scrotal Wall	Distance
Mass – 1	Distance, Volume
Mass – 2	Distance, Volume
Mass – 3	Distance, Volume

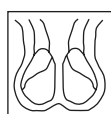
Testis Vessels Measurement Labels ▪ Doppler

Testis Measurement Label	2D-Mode Measurement Tools	Doppler Measurement Tool
Testicular A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Epididymal A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Intratesti A	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Epididymal V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Intratesti V	Distance Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

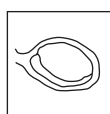
Testis Pictograms



Groin



Testis



Long Testis

Thyroid

System-defined measurement labels are available for the thyroid application. Prefix labels are available to indicate right and left.

The system calculates thyroid volume according to the following formula:

$$\text{Thyroid volume} = \text{Length} \times \text{Height} \times \text{Width} \times 0.479$$

where length, height, and width are diameter measurements of a thyroid lobe and 0.479 is the empirical factor.

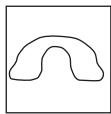
Reference

Volumetrie der Schilddruesenlappn mittels Realtime-Sonographie; J Brunn, U. Block, G. Ruf, et al.; Dtsch.med. Wschr.106 (1981), 1338-1340.

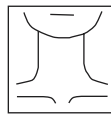
Thyroid Measurement Labels ■ 2D-Mode

2D-Mode Thyroid Measurement Label	Measurement Tool
Thyroid Lobe	Distance Volume
Isthmus	Distance
Parathyroid	Distance
Mass	Distance Volume

Thyroid Pictograms



Thyroid



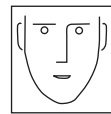
Neck



Neck, Left



Neck, Right



Face



*Face Left,
Tongue Out*



*Face Right,
Tongue Out*



*Neck
Hyperextended*

Musculoskeletal

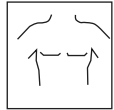
System-defined measurement labels are not available for this application.



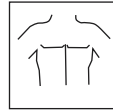
System Reference

CALCS:	
Standard	Ch 1
Measurements	Ch 1
Pictograms	Ch 1
Patient Report	Ch 1

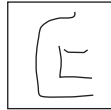
Musculoskeletal Pictograms



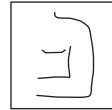
Shoulder, A-P



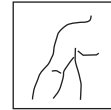
Shoulder, P-A



Right Elbow, Lateral



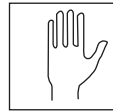
Left Elbow, Lateral



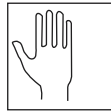
Right Elbow, A-P



Left Elbow, A-P



Right Hand



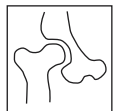
Left Hand



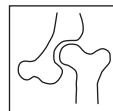
Left Wrist



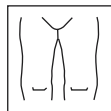
Right Wrist



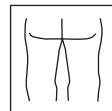
Hip, Right



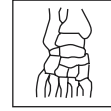
Hip, Left



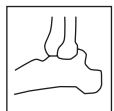
Knee, A-P



Knee, P-A



Ankle, A-P



Ankle, Lateral



Right Foot



Left Foot

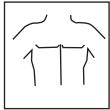
Superficial Musculoskeletal

System-defined measurement labels are not available for this application.

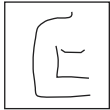
Superficial Musculoskeletal Pictograms



Shoulder, A-P



Shoulder, P-A



Right Elbow, Lateral



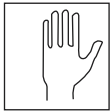
Left Elbow, Lateral



Right Elbow, A-P



Left Elbow, A-P



Right Hand



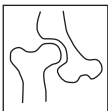
Left Hand



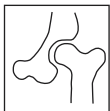
Left Wrist



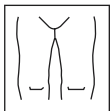
Right Wrist



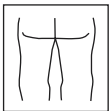
Hip, Right



Hip, Left



Knee, A-P



Knee, P-A



Ankle, A-P



Ankle, Lateral



Right Foot

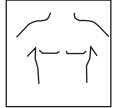


Left Foot

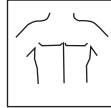
Digital

System-defined measurement labels are not available for this application.

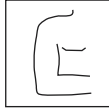
Digital Pictograms



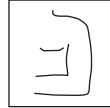
*Shoulder,
A-P*



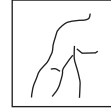
*Shoulder,
P-A*



*Right Elbow,
Lateral*



*Left Elbow,
Lateral*



*Right Elbow,
A-P*



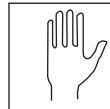
*Left Elbow,
A-P*



Right Foot



Left Foot



Right Hand



Left Hand

Cerebrovascular (CV)

System-defined measurement labels are available for the cerebrovascular application. Prefix labels are available to indicate right, middle, left, proximal, and distal.

Cerebrovascular Measurement Labels

CV Measurement Labels	2D-Mode Measurement Tool	Doppler Measurement Tools
CCA (Common Carotid Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ECA (External Carotid Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ICA (Internal Carotid Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Vert A (Vertebral Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Subclav A (Subclavian Artery)	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Innom A (Innominate Artery [also called Brachiocephalic Artery])	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Aorta	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

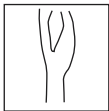
Cerebrovascular Calculation Labels

The system calculates a ratio of the highest Internal Carotid Artery (ICA) velocity or frequency to the highest Common Carotid Artery (CCA) velocity or frequency. A ratio is available for each side, right and left. The greatest measured value among the proximal, middle, and distal measurements for the body side is used. This ratio is not affected by the preset selection for Doppler ratios.

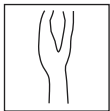
- **Highest R ICA / Highest R CCA**
- **Highest L ICA / Highest L CCA**

CV Calculation Labels
R Prox CCA/L Prox CCA
R Mid CCA/L Mid CCA
R Dist CCA/L Dist CCA
(Right and left proximal, middle, and distal Common Carotid Arteries)

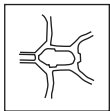
Cerebrovascular Pictograms



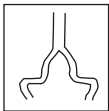
Carotid Left



Carotid Right



Circle of Willis



Vert-Basilar



Neck

Transcranial Doppler (TCD)

TCD measurement labels are organized into the following groups:

- Group 1
- Group 2

Additional labels are available to indicate right, left; and proximal, middle, and distal.

TCD Measurement Labels

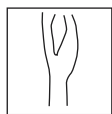
TCD			
Measurement Label	Description	2D-Mode Measurement Tool	Doppler Measurement Tool
MCA	Middle Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ICA-Siphon	Internal Carotid Artery-Siphon	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ACA-A1	The A-1 section of the Anterior Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ACA-A2	The A-2 section of the Anterior Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
ACoA	Anterior Communicating Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
PCA-P1	The P1 section of the Posterior Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

TCD			
Measurement Label	Description	2D-Mode Measurement Tool	Doppler Measurement Tool
PCA-P2	The P2 section of the Posterior Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
PCoA	Posterior Communicating Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
PCA	Posterior Cerebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Basilar A	Basilar Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Vert A	Vertebral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

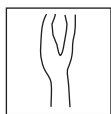
TCD Calculation Labels

TCD Calculation Label	Description
MCA/ICA-S	Middle Cerebral Artery/ Internal Carotid Artery-Siphon

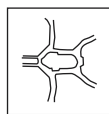
TCD Pictograms



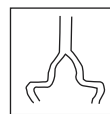
Carotid Left



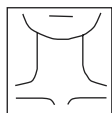
Carotid Right



Circle of Willis



Vert-Basilar



Neck



Face Up



Face Down



Head Up



Head Down

Peripheral Vascular ■ Arterial (PV-Art)

Peripheral Vascular – Arterial measurement labels are organized into the following groups:

- Leg Group 1
- Leg Group 2
- Peripheral Arterial Arm (PA Arm)

Additional labels are available to indicate view: right, left; and proximal, middle, and distal.

Peripheral Vascular ■ Arterial Leg

Measurement Label	Description	2D-Mode Measurement Tool	Doppler Measurement Tool
Abd. Aorta	Abdominal Aorta	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
CIA	Common Iliac Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
IIA	Internal Iliac Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
EIA	External Iliac Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
CFA	Common Femoral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Measurement Label	Description	2D-Mode Measurement Tool	Doppler Measurement Tool
SFA	Superficial Femoral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
PFA	Profunda Femoral Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Pop A	Popliteal Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
T-P Trunk A	Tibial Peroneal Trunk Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Post Tib A	Posterior Tibial Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Ant Tib A	Anterior Tibial Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Peroneal A	Peroneal Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
DPA	Dorsalis Pedis Artery	Distance Stenosis Volume Flow	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Peripheral Vascular ■ Arterial PA Arm

Measurement Label	Description	2D-Mode Measurement Tool	Doppler Measurement Tool
Innom A	Innominate Artery (also called Brachiocephalic Artery)	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
CCA	Common Carotid Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Vert A	Vertebral Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Subclav A	Subclavian Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Axillary A	Axillary Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Deep Brach A	Deep Brachial Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Brachial A	Brachial Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Radial A	Radial Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow
Ulnar A	Ulnar Artery	Distance Stenosis Volume	Velocity Trace RI-S/D Slope Heart Cycle Volume Flow

Peripheral Vascular ■ Arterial Pictograms



Left Groin



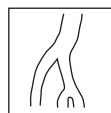
Right Groin



Right Thigh



Left Thigh



Right Knee



Left Knee



*Right Ankle,
Vessel*



*Left Ankle,
Vessel*



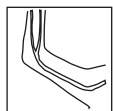
Neck, Left



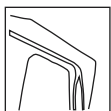
Neck, Right



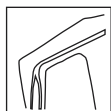
Left Arm, Up



Right Arm, Up



Left Arm, Down



*Right Arm,
Down*



*Right Elbow,
A-P*



Left Elbow, A-P

Peripheral Vascular ■ Venous

System-defined measurement labels are not available for the PV ■ Venous examination.

Peripheral Vascular ■ Venous Pictograms

The pictograms available for the Peripheral Vascular Venous examination are the same as those available for the PV Arterial examination.



System Reference

Piktogramme für PV-Arteriell	2-26
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Pediatric

The Pediatric exam provides a Hip Angle compound measurement, consisting of three lines that define two angles, α and β .

System-defined measurement labels are available for the Hip Angle measurement. Additional labels are available to indicate the right and left hips.



System Reference

CALCS:
Hip Angle Tool Ch 1

Reference

Graf, F. "Sonographic Diagnosis of Hip Dysplasia and Hip Dislocation"; Revised by R. Graf from reprint: P. Schuler, R. Graf; "Sonographie in der Orthopaedie in Braun – Guenther-Schwert; Ultraschalldiagnostik, 4. Erg. Lfg. 7, 1986; Ecomed Verlag; Tanslated by Terry Telger

Pediatric Hip Angle ■ 2D-Mode Labels

Measurement Label	2D-Mode Measurement Tool
Hip	Hip Angle

Graf Sonometer

Use the system presets to display a Graf Sonometer when the Pediatric Hip Angle measurement is complete. The sonometer graphs the α and β measurements for analysis of hip type. There is a sonometer for each side.



App-specific settings

Using the Hip Angle Tool

The **Hip Angle Tool** is available, with selected transducers, in 2D-mode for the Pediatric application.

The system uses three lines to define two angles. The first line you place on the image is the reference line. In combination with the reference line, the second line defines the α angle. In combination with the reference line, the third line defines the β angle.

To measure a hip angle:

1. Activate the measurement function for the Pediatric application.
2. Select the **Hip** label and then **R** (right) or **L** (left).

The system displays the first measurement marker.

Note: For the α angle, the system measures the angle between the end point of the reference line and the starting point of the angle line. For the β angle, the system measures the angle between the end point of the reference line and the end point of the angle line. Use this information to determine the starting and end points of the reference line with respect to the head of the femur.

3. Roll the trackball to position the measurement marker at the beginning of the reference line and then press the **SELECT** key.

The system displays a line, with an arrow indicating the end of the line.

4. Roll the trackball to position the measurement marker at the end of the reference line and then press the **SELECT** key.

The system displays another measurement marker.

5. Roll the trackball to position the measurement marker at the beginning of the α angle line and then press the **SELECT** key.

6. Roll the trackball to position the measurement marker at the end of the α angle line and then press the **SELECT** key.

The system updates the α angle measurement and displays another measurement marker.

7. Roll the trackball to position the measurement marker at the beginning of the β angle line and then press the **SELECT** key.

The system updates the β angle measurement and displays another measurement marker.

8. Roll the trackball to position the measurement marker at the end of the β angle line and then press the **SELECT** key.

The system updates the β angle measurement and displays a Graf sonometer for analysis of the hip type. The measurement and the labeled sonometer are transferred to the patient report. If you perform a second hip angle measurement on the same side, the report displays the results for the second measurement.

9. To re-start a hip angle measurement, press the **Universal 1** key.

Pediatric Pictograms



Liver



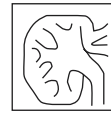
Pancreas



Spleen



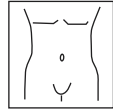
Biliary



Right Kidney



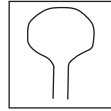
Left Kidney



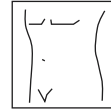
Supine



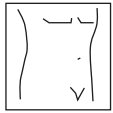
Prone



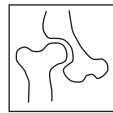
Bladder



Right Decubitus



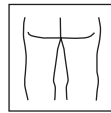
Left Decubitus



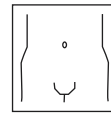
Hip, Right



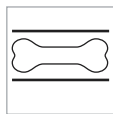
Hip, Left



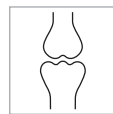
Prone Hip



Supine Hip



Long Bone



Joint

Pediatric Patient Report

The report provides separate sections for the right and left hips. Each section includes measured results, a Graf Sonometer if displayed, the α and β angle measurements, and descriptive fields.

Hip Description Field	Selection
Osseous Profile	(blank) I: Good II: Deficient D: Deficient III: Poor IV: Poor
Osseous Acetabulum	(blank) I: Sharp II: Round D: Round/Flat III: Flat IV: Flat
Cartilaginous Acetabulum	(blank) I: Narrow II: Wide/Overlapped D: Everted III: Everted Echo Free III: Everted Echo Poor IV: Everted
Type	Ia Ib IIa IIb IIc IIIa IIIb

Pelvis

System-defined measurement labels are available for the pelvis application. Prefix labels are available where appropriate to indicate left and right.

The system calculates micturated volume as:

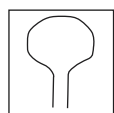
Pre-void bladder volume minus post-void bladder volume.

Pelvis Anatomy Measurement Labels

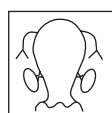
■ 2D-Mode

Pelvis Measurement Label	Measurement Tool
Prostate	Distance, Volume
Pre-Void Bld	Volume
Post-Void Bld	Volume
Seminal Ves	Distance
Urethra	Distance, Stenosis
Ureter	Distance
Kidney	Distance, Volume

Pelvis Pictograms



Bladder



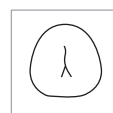
Coronal Uterus



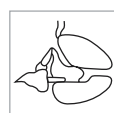
Right Ovary



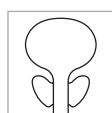
Left Ovary



*Prostate
Transverse/
Coronal*



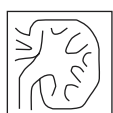
*Prostate
Sagittal*



Bladder Prostate



Right Kidney



Left Kidney

Prostate

System-defined measurement labels are available for the prostate application. Prefix labels are available where appropriate to indicate left and right.

The system calculates prostate weight as:

Prostate volume x specific gravity of the prostate.

Use the system presets to select a specific gravity of 1.0 or 1.05.



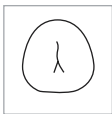
App-specific settings

Prostate Anatomy Measurement Labels

■ 2D-Mode

Prostate Measurement Label	Measurement Tool
Prostate	Distance, Volume
Rectal Wall	Distance
Seminal Ves	Distance
Urethra	Distance, Stenosis
Mass 1	Distance, Volume
Mass 2	Distance, Volume
Mass 3	Distance, Volume
Kidney	Distance, Volume

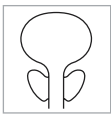
Prostate Pictograms



Prostate
Transverse/
Coronal



Prostate Sagittal



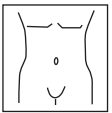
Bladder
Prostate



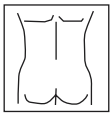
Right Kidney



Left Kidney



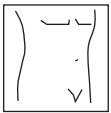
Supine



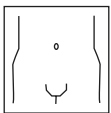
Prone



Right Decubitus



Left Decubitus



Groin

Penile

System-defined measurement labels are available for the penile application.
Prefix labels are available where appropriate to indicate left and right.

Penile Anatomy Measurement Labels ■ 2D-Mode

Penile Measurement Label	Description	Measurement Tool
Corp Cav	Corpus Cavernosum	Distance, Stenosis
Corp Spong	Corpus Spongiosum	Distance, Stenosis
Cav A	Cavernosal Artery	Distance, Stenosis
Pre-Inj Cav A	Pre-Injection Cavernosal Artery	Distance, Stenosis
Post-Inj Cav A	Post-Injection Cavernosal Artery	Distance, Stenosis
Urethra	Urethra	Distance, Stenosis

Penile Vessels Measurement Labels ■ Doppler

Penile Measurement Label	Description	2D-Mode Measurement Tools	Default Doppler Measurement Tool
Iliac A	Iliac Artery	Distance, Stenosis, Volume Flow	Velocity
Dorsal A	Dorsal Artery	Distance, Stenosis, Volume Flow	Velocity
Urethral A	Urethral Artery	Distance, Stenosis, Volume Flow	Velocity
Bulbar A	Bulbar Artery	Distance, Stenosis, Volume Flow	Velocity
Brach A	Brachial Artery	Distance, Stenosis, Volume Flow	Velocity
Cav A	Cavernosal Artery	Distance, Stenosis, Volume Flow	Velocity
Pre-Inj Cav A	Pre-Injection Cavernosal Artery	Distance, Stenosis, Volume Flow	Velocity
Post-Inj Cav A	Post-Injection Cavernosal Artery	Distance, Stenosis, Volume Flow	Velocity
Sup Dorsal V	Superficial Dorsal Vein	Distance, Stenosis, Volume Flow	Velocity
Dp Penile V	Deep Penile Vein	Distance, Stenosis, Volume Flow	Velocity

Penile Calculations ▀ Doppler

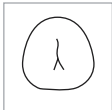
The system calculates the following penile Doppler ratios. Use the system presets to select the measurements used for the ratio.

- Left Cavernosal Artery / Left Brachial Artery
- Left Cavernosal Artery / Right Brachial Artery
- Right Cavernosal Artery / Left Brachial Artery
- Right Cavernosal Artery / Right Brachial Artery



**Doppler
measurement tools**

Penile Pictograms



*Prostate
Transverse/
Coronal*



Prostate Sagittal



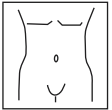
Bladder Prostate



Right Kidney



Left Kidney



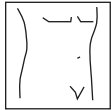
Supine



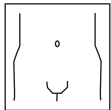
Prone



Right Decubitus



Left Decubitus



Groin

Fetal Echo

System-defined measurement labels are available for the Fetal Echo application. Suffix labels are available where appropriate to indicate systole and diastole. You can use system presets to create user-defined measurement labels.

The system provides a separate menu display page for each group of measurements, such as left heart, right heart, valves, and ventricles. The patient report provides a separate table for each group for which you have made measurements.

The patient report displays a Fetal Heart Rate section when you have made a Fetal HR measurement. The system displays the latest value, whether edited in the report or measured in M-mode or Doppler.

The system provides a Fetal Echo Survey Data section.

- Fetal Heart Rhythm – Text entry
- Situs Inversus – Text entry
- Pulmonary Veins – Drop-down menu, select Yes or No
- Pericardial Fluid – Drop down menu, select Present or Absent

Fetal Echo Measurement Labels ■ 2D-Mode

Fetal Echo Left Heart Measurement Label	Description	Measurement Tool
LA Width	Left Atrium Width	Distance
LA Length	Left Atrium Length	Distance
LVPW	Left Ventricular Posterior Wall	Distance
LV Length	Left Ventricular Length	Distance
LVID	Left Ventricular Internal Diameter	Distance
LVOT	Left Ventricular Outflow Tract	Distance
IVSd	Interventricular Septum at diastole	Distance
Fetal Echo Right Heart Measurement Label	Description	Measurement Tool
RA Width	Right Atrium Width	Distance
RA Length	Right Atrium Length	Distance
RVAW	Right Ventricular Anterior Wall	Distance
RV Length	Right Ventricle Length	Distance
RVID	Right Ventricular Internal Diameter	Distance
RVOT	Right Ventricular Outflow Tract	Distance
Fetal Echo Cardiothoracic Measurement Label	Description	Measurement Tool
HA	Fetal Heart Area	Ellipse
TA	Thoracic Area	Ellipse

Fetal Echo Arteries		
Measurement Label	Description	Measurement Tool
Aortic Arch	Aortic Arch	Distance
AoD	Aortic Root Diameter	Distance
Ascend Ao	Ascending Aorta	Distance
Descend Ao	Descending Aorta	Distance
Trans Ao	Transverse Aorta	Distance
Ductal Arch	Ductal Arch	Distance
DA	Ductus Arteriosus	Distance
Isthmus	Isthmus	Distance
PA	Pulmonary Artery	Distance
MPA	Main Pulmonary Artery	Distance
Umb A	Umbilical Artery	Distance
Fetal Echo Valves		
Measurement Label	Description	Measurement Tool
AV	Aortic Valve	Distance
Fetal Echo Veins		
Measurement Label	Description	Measurement Tool
SVC	Superior Vena Cava	Distance
IVC	Inferior Vena Cava	Distance
L Pulmon V	Left Pulmonary Vein	Distance
R Pulmon V	Right Pulmonary Vein	Distance
Umb V	Umbilical Vein	Distance

Fetal Echo Measurement Labels ■ M-Mode

Fetal Echo Left Heart Measurement Label	Description	Measurement Tool
LA	Left Atrium	Distance
MV	Mitral Valve	Distance, Slope
LVPW	Left Ventricular Posterior Wall	Distance
LVID	Left Ventricular Internal Diameter	Distance
IVSd	Interventricular Septum at diastole	Distance
AV	Aortic Valve	Distance, Slope
AoD	Aortic Root Diameter	Distance
LVET	Left Ventricular Ejection Time	Time
Fetal HR	Fetal Heart Rate	HR

Fetal Echo Right Heart Measurement Label	Description	Measurement Tool
RA	Right Atrium	Distance
TV	Tricuspid Valve	Distance, Slope
RVAW	Right Ventricular Anterior Wall	Distance
RVID	Right Ventricular Internal Diameter	Distance
PV	Pulmonic Valve	Distance, Slope
PA	Pulmonary Artery	Distance
RVET	Right Ventricular Ejection Time	Time

Fetal Echo Measurement Labels ■ Doppler

The system calculates the ratio of the Mitral Valve E wave and A wave according to the following formula:

$$\text{MV E/A} = \text{MV Epeak/MV Apeak}$$

Reference

Appleton CP, Liv KH, Popp RL. "Relation of Transmitral Flow Velocity Patterns to Left Ventricular Diastolic Function: New Insights from a Combined Hemodynamic and Doppler Echocardiographic Study." *Journal of American College of Cardiology*, 1988;12(2):426-440.

The Tei Index is a measure of the myocardial performance of the left ventricle, using left ventricular isovolumic contraction time, isovolumic relaxation time, and ejection time. The system calculates the Tei Index according to the following formula:

$$\text{Tei I} = (\text{LVICT} + \text{LVIRT}) / \text{LVET}$$

Reference

Tsutsumi T, Ishii M, Eto G, Hota M, Kato H. "Serial Evaluation for Myocardial Performance in Fetuses and Neonates using a New Doppler Index." *Pediatr Int*, 41(6):722-727, 1999.

Fetal Echo Valves		
Measurement Label	Description	Default Doppler Measurement Tool
MV Epeak	Mitral Valve E wave	Velocity
MV Apeak	Mitral Valve A wave	Velocity
AV	Aortic Valve	Velocity
PV	Pulmonic Valve	Velocity
FO	Foramen Ovale	Velocity
Fetal Echo Ventricles		
Measurement Label	Description	Default Doppler Measurement Tool
LVICT	Left Ventricular Isovolumic Contraction Time	Time
LVET	Left Ventricular Ejection Time	Time
LVIRT	Left Ventricular Isovolumic Relaxation Time	Time
RVET	Right Ventricular Ejection Time	Time
Fetal HR	Fetal Heart Rate	Heart Rate
Fetal Echo Arteries		
Measurement Label	Description	Default Doppler Measurement Tool
Ascend Ao	Ascending Aorta	Velocity
Descend Ao	Descending Aorta	Velocity
Trans Ao	Transverse Aorta	Velocity
DA	Ductus Arteriosus	Velocity
MPA	Main Pulmonary Artery	Velocity
Umb A	Umbilical Artery	Velocity
Fetal Echo Veins		
Measurement Label	Description	Default Doppler Measurement Tool
SVC	Superior Vena Cava	Velocity
IVC	Inferior Vena Cava	Velocity
L Pulmon V	Left Pulmonary Vein	Velocity
R Pulmon V	Right Pulmonary Vein	Velocity
Umb V	Umbilical Vein	Velocity

Fetal Echo Calculation Labels

The system calculates the Cardiothoracic Area (CTA) Ratio using the fetal Heart Area (HA) and Thoracic Area (TA):

$$CTA = HA/TA$$

Reference

Chaoui R, Bollmann R, Goldner B, Heling KS, Tennstedt C. "Fetal Cardiomegaly: Echocardiographic Findings and Outcome in 19 Cases." *Fetal Diagn Ther* 1994; 9:92-104.

The system calculates the left ventricular percentage of fractional shortening for 2D-mode and M-mode using the left ventricular internal diameters at diastole and systole:

$$LV\%FS = (LVIDd - LVIDs) / LVIDd * 100$$

Reference

Wladimiroff JW, McGhie, JS. "M-Mode Ultrasonic Assessment of Fetal Cardiovascular Dynamics." *British Journal of Obstetrics and Gynecology*, Vol. 88. 1981:1241-1245.

Fetal Echo Pictograms



Long Axis



Four Chamber



Para Long Axis

3 Obstetric Measurements, Calculations, and Reports

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Obstetric Examination

The measurement function provides measurements, calculations, and reports designed to address the requirements of the Obstetric (OB) examination. Basic and compound measurement tools are used to perform the measurements. The system provides OB-specific:

- Measurement labels and calculations
- Annotations and pictograms
- Patient report for all labeled measurements
- Customization of tools, calculations, and reports

All basic and compound measurement tools are available for the OB study type. The results of the measurements and calculations can be used to:

- Estimate gestational age
- Estimate ultrasound age
- Estimate fetal weight
- Determine growth ratios
- Establish a growth percentile
- Calculate Doppler ratios

You can also generate Growth Analysis Graphs for each OB examination. Growth Analysis compares actual fetal growth to predicted growth patterns.

Each OB examination supports multiple gestations up to quadruplets.



System Reference

CALCS:
Measurement
tools Ch 1



System Presets

OB Measurement Tools

All basic and compound measurement tools in 2D-mode, Doppler, and M-mode are available for use with the OB examination.

Imaging Mode	Measurement Tool	Compound Measurement Tool
2D-mode	Distance	Volume
	Ellipse	Stenosis
	Trace	Volume Flow
Doppler	Velocity/Frequency	Doppler Ratio
	RI-S/D	Volume Flow
	Heart Cycle	
	Trace	
	Slope	
	Time	
	Heart Rate	
	Auto Stats On/Off	
	Above/Below Baseline	
M-mode	Distance	
	Slope	
	Heart Rate	

Customizing Measurement Tools

Use system presets to select the default tools for use with the OB application during the Measurement function in 2D-mode and in Doppler.

A system-wide selection is available for you to customize the number of cycles to use when measuring heart rate.

2D-mode selections are available for you to customize the:

- Default tool to use for volume measurements
- Default tool to use for stenosis measurements
- Default tool to use for Obstetrical circumference measurements (ellipse or trace)

Doppler selections are available for you to customize the:

- Heart Cycle and Trace values to display in Measured Results
- Resistive Index values to display in Measured Results
- Default measurement method for Volume Flow



System Reference

CALCS:	
Customizing applications	Ch 1
RESOURCES:	
System Presets	Ch 1



System-wide measurement tools
2D-mode measurement tools
Doppler measurement tools

Obstetrics Measurement Labels

The system provides lists of OB measurement labels in the following categories:

- 2D-mode labels for estimating gestational age (GA): **GA/Basic 1** and **GA/Basic 2**.
- 2D-mode labels not used for estimating gestational age: **Non-GA 1**, **Non-GA 2**, and **Non-GA 3**.
- M-mode and Doppler **Arterial** labels.
- User-defined **Custom** measurement labels for each mode.

Use the system presets to specify whether a measurement label displays.



Meas. Labels Display
Presets menu option

To select a list of measurement labels:

1. During an OB exam, display the **Calcs** task card.
2. Roll the trackball to the name of the list of measurement labels, such as **GA/Basic 1**, and then press the **SELECT** key.
3. In the drop-down menu, roll the trackball to highlight the name of the list you want to use and then press the **SELECT** key.

The system displays the labels in the selected list.

Measured values display on the screen in Measured Results and, if labeled, in the patient report.

To include a measured value in a patient report, first select the label and then perform the measurement.

Some calculations require more than one measurement. When that occurs, the system displays the required measurements in Measured Results. When a labeled measurement is completed, the system places a mark inside the check box next to the label, indicating that there is a value assigned to that label in the patient report.

Additional Labels

Additional labels are available where appropriate for right and left views.

Indicating Multiple Gestations

As many as four fetuses can be indicated using the labels provided on the Measurement Label menu. Fetuses are identified as fetus **A**, **B**, **C**, or **D**. When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**. Specify the number of fetuses observed during the OB exam in the Patient Registration form to activate the multiple gestation labels.

Measurement Labels ■ 2D-Mode

2D-Mode Labels for Estimating GA

Measurement Label	Description	Measurement Tool	Menu Display Page
BPD	Biparietal Diameter	Distance	GABasic1
HC	Head Circumference	Ellipse Trace	GABasic1
AC	Abdominal Circumference	Ellipse Trace	GABasic1
FL	Femur Length	Distance	GABasic1
CRL	Crown Rump Length	Distance	GABasic1
Binoc D	Binocular Distance	Distance	GABasic1
GSD	Gestational Sac Diameter	Distance	GABasic1
Humerus	Humerus Length	Distance	GABasic1
Ulna	Ulna Length	Distance	GABasic1
Tibia	Tibia Length	Distance	GABasic1
Clavicle	Clavicle Length	Distance	GABasic2
Foot	Foot Length	Distance	GABasic2
User-defined	Any user-defined label with a user-defined GA table	As defined	Custom

When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**.

2D-Mode Labels Not Related to Estimating GA

Measurement Label	Description	Fetal or Maternal	Measurement Tool	Menu Display Page
AFI	Amniotic Fluid Index	Fetal*	Distance	NonGA1
APAD	Anterior-Posterior Abdominal Diameter	Fetal*	Distance	NonGA1
LVW	Lateral Ventricle Width	Fetal*	Distance	NonGA1
OFD	Occipital Frontal Diameter	Fetal*	Distance	NonGA1
TAD	Transabdominal Diameter	Fetal*	Distance	NonGA1
TC	Thoracic Circumference	Fetal*	Ellipse Trace	NonGA1
TCD	Transcerebellar Diameter	Fetal*	Distance	NonGA1
HW	Hemispheric Width	Fetal*	Distance	NonGA1
Radius	Radius Length	Fetal*	Distance	NonGA1
Yolk Sac	Yolk Sac	Fetal*	Distance	NonGA2
Cist Magna	Cisterna Magna	Fetal*	Distance	NonGA2
Nuchal Thick	Nuchal Fold Thickness	Fetal*	Distance	NonGA2
Cervix Len	Cervix Length	Maternal	Distance	NonGA2
Mat Kidney	Kidney	Maternal	Distance Volume	NonGA2
Fetal Ao	Aorta	Fetal*	Stenosis Volume Flow	NonGA2
MCA	Middle Cerebral Artery	Fetal*	Stenosis Volume Flow	NonGA2
Umb A	Umbilical Artery	Fetal*	Stenosis Volume Flow	NonGA2
Ovarian A	Ovarian Artery	Maternal	Stenosis Volume Flow	NonGA2
Uterine A	Uterine Artery	Maternal	Stenosis Volume Flow	NonGA2
Fetal Kidney	Kidney	Fetal*	Distance Volume	NonGA3
FTA	Fetal Trunk Area	Fetal*	Ellipse Trace	NonGA3

*When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**.

Measurement Labels ■ Doppler

You can perform Doppler measurements using the velocity or frequency scale. The system displays results in the appropriate measurement units.

Measurement Label	Description	Fetal or Maternal	Measurement Tool
Fetal HR	Fetal Heart Rate	Fetal*	Heart Rate
Fetal Ao	Fetal Aorta	Fetal*	Velocity Trace RI/S-D Slope Heart Cycle Volume Flow
MCA	Middle Cerebral Artery	Fetal*	Velocity Trace RI/S-D Slope Heart Cycle Volume Flow
Umb A	Umbilical Artery	Fetal*	Velocity Trace RI/S-D Slope Heart Cycle Volume Flow
Ovarian A	Ovarian Artery	Maternal	Velocity Trace RI/S-D Slope Heart Cycle Volume Flow
Uterine A	Uterine Artery	Maternal	Velocity Trace RI/S-D Slope Heart Cycle Volume Flow

*When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**.

Calculation Label ■ Doppler

Calculation Label	Description	Fetal or Maternal	Measurement Tool
MCA/Umb A	Middle Cerebral/ Umbilical Artery ratio	Fetal*	Velocity

*When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**.

Fetal Heart Rate

For the OB examination, an unlabeled heart rate measurement displays in the patient report as the patient (maternal) heart rate. The fetal heart rate (**Fetal HR**) can be measured using either an M-mode sweep or a Doppler waveform, and you can manually edit the value in the patient report. Only the last value is saved. Use the system presets to specify the number of heart cycles included in the heart rate measurement.



**System-wide
measurement tools**

Measurement Labels ■ M-Mode

Measurement Label	Description	Maternal or Fetal Measurement	Measurement Tool
Fetal HR	Fetal Heart Rate	Fetal*	Heart Rate

*When multiple fetuses are observed, each fetus must be identified as **A**, **B**, **C**, or **D**.

Customizing OB Measurement Labels

Use system presets to create and delete user-defined OB measurement labels. These labels display in the **Custom** labels list in the Measurement Menu. When you create the label, you can select the section of the patient report in which it displays.



Custom Meas. Labels
Presets menu option

OB Pictograms

Pictograms are available for the OB examination.

OB Calculations

The system provides calculations designed to address the clinical requirements of the OB examination. Some calculations require an LMP (last menstrual period) or IVF (in vitro fertilization) date. Display of calculated results for EFW, OB ratios, and growth analysis depends on the reference author selected. These calculations include:

- Estimated Gestational Age
- Ultrasound Age (US Age) and Ultrasound Estimated Date of Confinement (US EDC)
- Estimated Fetal Weight
- Growth Analysis (Growth Curve)
- Growth Percentile
- Doppler Ratios
- OB Ratios and Cephalic Index
- Amniotic Fluid Index

The system uses tables and formulas to perform these calculations. When you select a label before performing a measurement, the calculations associated with that label are used for the measurement.

Customizing OB Calculations

You can use the system presets to designate the reference (author) of the table or formula for the following calculations:

- Gestational Age
- Composite Gestational Age
- Growth Analysis
- Estimated Fetal Weight

Each reference uses a specific range of values. If a measured or calculated value is outside the range for the selected reference, the system displays asterisks (***). You can use the drop-down menu in the patient report to select another reference for the current exam.

The system displays Estimated Fetal Weight in grams; to also display EFW in pounds and ounces, use system presets to select the U.S. measurement system.



OB Calculations
Presets menu option



Regional Options
Basic System
Presets menu option

Customizing Gestational Age Tables

You can create, edit, and delete a user-defined, new simple gestational table in system presets. The table can contain values for a user-defined measurement label or for one of the system-defined 2D-mode measurement labels. System-defined Gestational Age Tables cannot be modified or deleted.



Custom Gest.
Age Tables
Presets menu option

Customizing Display of OB Ratios

The system calculates the following ratios when the required labeled measurements have been made. The system preset that determines display of the most recent value or the mean of all measured values for a label also determines the value used in a ratio calculation.

- Cephalic Index (CI) – Calculated using the short axis of the HC measurement divided by the long axis.
- $HC/AC = HC/AC$
- $FL/BPD = FL/BPD * 100$
- $FL/HC = FL/HC * 100$
- $FL/AC = FL/AC * 100$
- $TCD/AC = TCD/AC * 100$
- $LVW/HW = LVW/HW * 100$

The normal range of the ratio is shown in parentheses in the patient report. Use the system presets to modify the measurement report settings to include or exclude specific ratios.



Meas. Report Settings
Presets menu option

Determining an Amniotic Fluid Index

Use the Amniotic Fluid Index (AFI) measurement method to calculate an index for amniotic fluid volume. This method requires a distance measurement made in each of the four quadrants, using four separate images.

To measure an Amniotic Fluid Index:

1. During an OB exam, acquire and freeze a 2D-mode image.
2. In the **Non-GA1** list of measurement labels, roll the trackball to the **AFI** measurement label and then press the **SELECT** key.

The system activates the AFI compound measurement tool.

3. Roll the trackball to position the first measurement marker and then press the **SELECT** key.

The system anchors the marker and displays the second marker.

4. Roll the trackball to position the second marker and then press the **SELECT** key.

The system updates the value for the Distance (**D**).

5. Obtain additional images as required and perform steps 3 and 4 for each image.

The system displays the distance value (**D**) for each quadrant.

6. To cancel and re-start the AFI measurement, roll the trackball to **DELETE** in the menu and then press the **SELECT** key.

When all four quadrants are measured the system calculates the amniotic fluid index (**AFI**) and transfers the value to the report.

OB Patient Registration

In addition to the standard fields, there are application-specific fields in the OB **Patient Registration** form. These fields allow you to:

- Select whether LMP (last menstrual period) or IVF (in vitro fertilization date) will be used to calculate clinical age. If a date is entered here, the EDC (estimated date of confinement) and the Age (fetal age) are calculated by the system.
- Note:** To ensure an accurate calculation, enter the date in the same format used for the system date.
- Enter a date for EDC. If a date is entered here, the system calculates clinical age.
 - Enter clinical age in weeks and days. If the age is entered here, the system calculates the EDC.
 - Specify the number of fetuses observed during examination.
 - Enter obstetrical history data, including: Gravida, Para, Aborta, and Ectopics.

A text box is available for entry of additional information as necessary.

OB Patient Report

The system transfers labeled measurements and calculations from Measured Results to the patient report. You can edit measurements and calculations by entering new values in the patient report. The system displays a growth percentile for a labeled value if it is within the valid range of the selected growth curve; the percentile updates when you select a different reference for the measurement.

The system also transfers information from the patient registration form into the patient report, including: the patient's name, identification number, study type, date of birth, age, gender, height and weight, blood pressure, study date, and information about the institution and physicians.

When multiple fetuses are present, the system displays the reports for each fetus individually. To compare measured gestational age values for a multiple gestation, select the display format **Side By Side** in the left-hand column of the patient report.



Instructions for Use

Patient
Registration form Ch 5



System Reference

CALCS:
Patient reports Ch 1

Biophysical Profile

The patient report includes the following descriptive fields:

- Fetal Tone
- Fetal Breathing
- Fetal Movements
- Amniotic Fluid

Enter a value of 0, 1, or 2 for each field. When a value is selected for every field, the system totals the four fields to calculate a score for the biophysical profile.

Growth Curves Graph

A growth analysis graph displays lines that indicate the upper limit, the 50th percentile, and the lower limit for predicted fetal growth patterns according to the selected reference for a measurement or calculation label. The system plots the mean measurement value for a label in the current exam on the y axis against the clinical age on the x axis.

References for growth analysis often differ from the references for gestational age estimation for the same label. For growth analysis studies, gestational age is assumed to be known.

Measured values for the same label from more than one fetus are plotted on a single growth graph, using a single reference author. Use the drop-down box to change the reference. Icons of different shapes and colors represent the fetuses. A sidebar (legend) indicates which icon is associated with each fetus.

The system does not calculate a growth percentile for a measured or calculated value that falls outside the limits of the growth curve for the established gestational age.



**OB calculations
menu option**

1 Patient Data Management

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About the Patient Browser

The patient browser displays patient data stored on the following storage locations: local database, the connected HIS/RIS server (if any), and the inserted compact disk (CD). Elements of the patient browser include the menus, the toolbar, the navigation section, the content section, and the information section. The information section is displayed for Tree View layout only; display of the toolbar and the information section can be enabled or disabled.

Within the navigation and content sections, the system displays the storage locations, the patient data, the status indicators, and the information about the selected patient data. Status indicators denote occurrences of printing, transferring, and other actions for the selected patient data. Information about the patient data (such as referring physician or study type) is displayed according to the pre-selected headings. Use the **Browser Configuration** window to configure display of status indicators and headings.

The organization of the patient data within the navigation section and/or the content section depends on the selected layout (Tree View or Single View). The Tree View layout is the default setting.

Storage Locations

Each storage location is represented by an icon. The patient browser lists patient data in the following storage locations:

Note: Patient data that has been exported to directories on the system's hard disk (such as "c:\temp") are not displayed in the patient browser, although you can import them to the **Local Database**.

- **Local Database** – data for the current examination and previous examinations stored on the hard disk.
- **Scheduler** – data for pre-registered patients and/or data for scheduled patients stored on the hard disk. Pre-registered patient data is entered using the **Patient Registration** form on the ultrasound system. Scheduled patient data is entered using the connected HIS/RIS (Worklist) server.
- **CD-R_READ** – data for previous examinations stored on the inserted CD.

Organization of Data

The patient browser uses a different set of data levels for patient data depending on the selected storage location (either the **Scheduler** or the **Local Database** and the **CD-R_READ**). The selected layout (Single View or Tree View) determines the organization of the data levels and of the patient browser controls and status indicators.



Instructions for Use

Patient browser menu selections and toolbar buttons	Ch 3
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System Reference

PATIENT DATA: Browser Configuration window	1-41
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Local Database icon.



Scheduler icon.



CD-R_READ icon.

Local Database and CD-R_READ Data Levels

The patient browser organizes patient data stored on the **Local Database** and the **CD-R_READ** by the following data levels, which are listed in hierarchical order, from highest level to lowest level. Each data level (except for images) is represented by an icon.

- Patient folder
- Study folder
- Series object
- Image

A patient folder may contain multiple study folders; a study folder may contain multiple series objects. A series object may contain multiple images.

The system creates additional series objects within a study folder when you store 3-Scape images in addition to other types of images or when you restart a completed study. For example, a study folder may contain two series objects for an examination completed on the first day of the week (the first series object containing M-mode images and the second series object containing 3-Scape images) plus a third series object containing images stored for an examination completed on the second day of the week, when you restarted the completed study.



Patient folder icon.



Study folder icon.



Series object icon.

Scheduler Data Levels

The patient browser organizes patient data stored on the **Scheduler** by the following data levels, which are listed in hierarchical order, from highest level to lowest level. Each data level (except for action items) is represented by an icon.

- Patient folder
- Procedure folder
- Procedure step (HIS/RIS only)
- Action item (HIS/RIS only)

A patient folder may contain multiple procedure folders; a procedure folder may contain multiple procedure steps. A procedure step may contain multiple action items.



Patient folder icon.



Procedure folder icon.



Procedure step icon.

Layouts (Single View and Tree View)

Data levels are organized by the selected layout: Single View or Tree View. Each layout displays a customized set of data in the navigation and content sections of the patient browser. The Tree View layout displays the information section also, if enabled.

The navigation section is located at the top of the patient browser, below the menus (and under the tool bar, if displayed). The content section is located at the bottom of the patient browser, above the status bar. The information section (available for Tree View only) is located below the navigation section and above the content section.

The navigation section displays patient data in a graphical format. The content section displays patient data in list (text) format.

Single View Layout

In Single View layout, the navigation section displays storage locations only, while the content section displays patient data according to the configured display level.

For example, if you select **Local Database** in the navigation section and the configured display level is **Patient – Study**, then the content section lists each study folder stored on the **Local Database**.

Tree View Layout

In Tree View layout, the navigation section displays storage locations, patient folders, plus study/procedure folder(s) and series object(s)/procedure step(s) for the currently selected item of patient data. The content section displays information about the data that is one level lower than the patient data item selected in the navigation section.

For example, if you select a patient folder on the **Local Database**, then the navigation section displays its study folders plus the series object(s) of the first study folder while the content section lists information about the displayed study folders.

The information section (when enabled) lists the patient name, date of birth, and ID. If a study/procedure folder is selected, then the study/procedure description and date is also displayed; if a series object/procedure step is selected, then the modality is also displayed.



System Reference

PATIENT DATA:	
Choosing the Layout	1-41
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Viewing Patient Data

Patient data is accessible from the patient browser. You can view and select patient data that is stored on the hard disk, connected HIS/RIS server, and compact disk (CD). Some methods of selection are specific to the patient browser layout (Tree View or Single View).

Accessing the Patient Browser

You can access the patient browser at any time.

To access the patient browser:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.

The system displays the **Patient Browser** screen.

2. To close the patient browser, select **Close Browser** from the **Patient** menu at the top of the patient browser. Alternatively, press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.

Selecting and Browsing Patient Data

You can view or retrieve patient data from a storage location on the left of the navigation section below the menus and toolbar buttons. You can select multiple items of patient data. The system highlights each selected item.

- In Tree View layout, you can select patient data from either the navigation section (such as patient folders) or the content section (such as images). The content section is located at the bottom of the patient browser. When you select an item in the navigation section, the system lists all items of the next lower data level in the content section. For example, if you select a patient folder in the navigation section, then the system lists all the patient's study folders in the content section.
- In Single View layout, you must select patient data from the content section.

You can select the first patient folder with a specific last name initial by pressing the corresponding key on the keyboard.

You can browse to view more patient data by using the keyboard or by using the trackball and **SELECT** key to select patient data or reposition the scroll bar.

Note: Multiple items of patient data can be selected within one data level (such as patient folders) and from one storage location.



System Reference

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Restarting a Study	1-20
Choosing the Layout	1-41
Customizing the Patient Browser Screen	1-41
Storage locations	1-3

To select:	Do this...
An item of patient data (such as a patient folder)	Roll the trackball to the item and then press the SELECT key on the control panel.
Nonconsecutive items of patient data	Press and hold the Ctrl key on the keyboard for each selection.
Consecutive items of patient data	Select the first item, press and hold the Shift key on the keyboard, and then select the last item.

To select the first patient folder with a specific last name initial:

- If the patient browser is in Tree View layout, select a patient folder in the navigation section and then enter the first letter of the patient's last name.
- If the patient browser is in Single View layout, select any patient data in the content section and then enter the first letter of the patient's last name.

To view more patient data using the scroll bar:

Note: A scroll bar is not displayed when all patient data is visible.

- Roll the trackball to position the pointer over the scroll bar on the right of the patient browser, press and hold the **SELECT** key, and then roll the trackball to reposition the scroll bar.

To view more patient data using the keyboard:

- Select an item of patient data in the patient browser by pressing the corresponding key.

Key	Selection
←	The data level that is immediately to the left of the currently selected patient data (Tree View navigation section only)
→	The data level that is immediately to the right of the currently selected patient data (Tree View navigation section only)
↓	The next lower item of patient data of the same data level (for example, the study folder displayed under the currently selected study folder, same patient)
↑	The next higher item of patient data of the same data level (for example, the study folder displayed above the currently selected study folder, same patient)
Pg Dn	The lowest visible item of patient data of the same data level
Pg Up	The highest visible item of patient data of the same data level
Tab	Toggle the navigation section with the content section (Tree View only)

Displaying and Hiding Series Objects

Series objects are one level lower than study folders. A study folder may contain multiple series objects. A series object may contain multiple images. In the Tree View layout, you can display or hide all series objects within all study folders for a patient.

To display all series objects for a selected patient folder (Tree View):

- Select **Open Subtree** from the **View** menu at the top of the patient browser.

To hide all series objects for a selected patient folder (Tree View):

- Select **Close Subtree** from the **View** menu at the top of the patient browser.

Filtering Patient Data

You can filter patient data displayed in the patient browser to facilitate a search. You can also add, edit, and delete filters.

When you filter patient data, the system displays only the patient data that meets all criteria of the selected filter.

For example, if you select the **Marked** filter, then the system displays marked items of patient data only. If the first study folder within a patient folder is unmarked while the second study folder is marked, then the system displays the second study folder but not the first folder.

If the patient browser is in Tree View layout, then the system displays the active filter name on the lower right of the screen and displays a pink-colored filter icon to the right of the selected storage location to indicate that data is filtered. When you disable the filter, the system displays all patient data in the patient browser.

To filter patient data (activate a filter):

1. Select a filter option from the **Filter** menu at the top of the patient browser.
2. To disable the currently active filter, select **Off** from the **Filter** menu at the top of the patient browser.

To create a user-defined filter:

1. Select **Filter Settings...** from the **Options** menu at the top of the patient browser.
The system displays the **Filter Specification** window.
2. If a filter name is displayed in the **Filter Name** drop-down box, then select the filter name and press the backspace key located on the keyboard.



System Reference

PATIENT DATA:
Series objects 1-4



Filter icon.



System Reference

PATIENT DATA:
Tree View 1-5



Instructions for Use

Filter Specification
window Ch 3

3. Use the keyboard to enter the name of the new filter into the **Filter Name** drop-down box near the top center of the window.
4. Select a criteria field from any drop-down box on the left of the window and then enter the required information; repeat with other drop-down boxes until all the criteria have been entered.
5. To delete entered text, roll the trackball to the right of the entry in the field, press the **SELECT** key on the control panel, and then press the backspace key on the keyboard repeatedly until all characters in the entry are removed.
6. Select the **OK** button.
The system saves the user-defined filter and lists it at the bottom of the **Filter** menu.
7. To apply the new user-defined filter, select it from the **Filter** menu at the top of the patient browser.

To edit a user-defined filter:

1. Select **Filter Settings...** from the **Options** menu at the top of the patient browser.
The system displays the **Filter Specification** window.
2. Select the filter from the **Filter Name** drop-down box.
3. To delete entered text, roll the trackball to the right of the entry in the field, press the **SELECT** key on the control panel, and then press the backspace key on the keyboard repeatedly until all characters in the entry are removed.
4. Change entries as required.
5. Select the **OK** button on the lower left of the window.
The system saves the changes to the filter.

To delete a user-defined filter:

1. Select **Filter Settings...** from the **Options** menu at the top of the patient browser.
The system displays the **Filter Specification** window.
2. Select the filter from the **Filter Name** drop-down box and then press the **Delete** button to the right of the drop-down box.
The system deletes the selected filter and removes it from the **Filter** menu.

Sorting Patient Data

When you select a sorting option for patient data in the patient browser, the system places a mark to the left of the selected option to indicate its activation, then sorts a specific data level according to the current layout.

The sorting function is available for the Tree View layout.

The **Sort** menu contains different selections depending on the level of patient data selected (storage location, patient folder, study folder, series object, or image).

Note: Sorting is restricted to the list of patients for the **Scheduler**.

Note: Sorting cannot be disabled. The system always uses a sorting option for each data level.



System Reference

PATIENT DATA:	
Layouts	1-5
Displayed data level for Single View	1-45

To:	Do this...
View the sorting option currently in use	Select the Sort menu at the top of the patient browser.
Enable a sorting option	Select an option from the Sort menu at the top of the patient browser.
Reverse the sorting order	Select Reverse Order from the Sort menu at the top of the patient browser.
Sort patients by name (Tree View only)	Select a storage location, such as Local Database , and then select Patient Name from the Sort menu at the top of the patient browser.

Sorting Images by Multiple Criteria (Tree View)

In Tree View layout, you can sort images by multiple criteria. The system orders the images by the first configured criterion. Images with the same value for the first criterion are sorted by the second configured criterion. Images with the same value for the second criterion are sorted by the third configured criterion. If images do not differentiate in the criteria selected, the system retains the original sequence.

To sort images by multiple criteria (Tree View only):

1. Select a series object or image from the patient browser.
2. Select **Multiple...** from the **Sort** menu at the top of the patient browser.

The system displays the **Image Display Order** dialog box, containing three drop-down lists. The top list represents the first criterion, the middle list represents the second criterion, and the bottom list represents the third criterion.

3. Select an option from each drop-down list in the **Image Display Order** dialog box.
4. Select the **OK** button.

Viewing Images

You can view images from a previous examination that is stored on the **Local Database**. Images are loaded from the patient browser to the **Review** task card.

Note: To view images stored on a CD, import them into the **Local Database**.

The patient name and patient ID for the currently displayed images are always displayed at the top of the screen. During an examination (when a patient is registered), the system also displays the current date and time at the top of the screen. During a review session, the system displays the study date and time instead of the current date and time.

To access the Review task card:

- Select the **Review** task card tab at the bottom of the screen.

To load images from a previous examination to the Review task card:

1. Press the **Browser** key on the keyboard to display the patient browser and then select a study folder, or select a series object within a study folder. Images are contained in the series objects.
2. Select **Load To Review** from the **Patient** menu at the top of the patient browser. Alternatively, you can double-click the selected item of patient data, or press the **Enter** key on the keyboard.
3. If applicable, confirm the system request to end the current patient examination.

The system ends the current examination, if any, and removes images from the **Review** task card. The system exits the **Patient Browser** and displays all images of the selected series object or study folder within the **Review** task card, according to the default display format.

4. To end the review session, select the **Exit Review** button.

The system displays the **Image** task card.



Instructions for Use

Review task card	Ch 3
Configuring the Print/Store Keys	Ch 4



System Reference

IMAGE: Retrieving and Viewing Stored 3-Scape Volumes	Ch 10
--	-------

Exit Review

The **Exit Review** button is located on the **Review** task card.

Changing the Display Format

During image review, you can change the display format. You can also toggle full-screen display format with the selected display format.

To change the display format:

- Select **Format** on the left of the screen and then use the **MENU** control to select a display format.

To toggle full-screen display format with the selected display format:

- Position the pointer over an image and then press the **UPDATE VIEW** key twice in quick succession.



Update View.

Hiding or Displaying Image Text

During image review, you can hide or display image text (such as patient name and imaging parameters) for images that were saved as ultrasound images with overlays.

To hide or display image text:

- Select **Text:** on the left of the screen and then select **Full** or **None**.



Instructions for Use

Ultrasound image
with overlays Ch 4

Scrolling through Pages on the Review Task Card

You can use the **UNIVERSAL 1** control on the control panel or the **Page** selection on the **Display** menu to scroll through pages of images on the **Review** task card.

Printing Images in the Review Task Card

Images loaded to the **Review** task card can be printed from the **Filming** screen.

To print images that have been loaded to the Review task card:

1. Select the image(s).
2. Select the **Copy to Film Sheet** button that is located within the Image Management Tools section on the left of the **Review** task card.

The system displays a message requesting printer selection.

3. Select a printer and then select **Continue**.
4. Choose one of the following methods to send the image(s) to the selected printer:
 - Select the **Exit Review** button to end the review session.
 - Press the **Film** key on the keyboard to display the **Filming** screen, select the film job folder containing the image(s), and then select the **Expose Film Task** button.

Performing Measurements during a Review Session

You can perform measurements on an image loaded to the **Review** task card. Measurements performed during the review session (review of previous examination[s]) are displayed in the patient report.

To perform measurements on an image:

1. Select an image on the **Review** task card.
2. Select the **Calcs** task card tab at the bottom of the screen.
The system displays the selected image on the **Calcs** task card.
3. Activate the measurement function and then create the required measurements.



System Reference

PATIENT DATA:	
Previewing and	
Printing Images	
in the Filming	
Screen	1-23
CALCS:	
Activating the	
Measurement	
Function	Ch 1
Patient Reports	Ch 1

Exit Review

The **Exit Review** button is located on the **Review** task card.



The **Expose Film Task** button is located on the **Filming** screen.

Printing and Storing during a Review Session

You can print and store images displayed in the **Review** task card and images with measurements displayed in the **Calcs** task card during a review session (review of previous examination[s]).

Use a **PRINT/STORE** key to create copies of images that are displayed in the **Review** task card or the **Calcs** task card during a review session. Use the system presets to assign print and/or store functionality to each **PRINT/STORE** key.

Images that you print or store during the review session are stored in a new series object within the current study folder. The system displays images from the new series object within the **Review** task card, in addition to the images previously loaded to review.

To print the displayed image(s):

- Press the **PRINT/STORE** key assigned to the printing function.

To store the displayed image(s):

- Press the **PRINT/STORE** key assigned to the storing function.



Print/Store



System Reference

PATIENT DATA:
Series objects 1-4



Instructions for Use

Ultrasound
image format Ch 4

Registering or Re-registering a Patient from the Patient Browser

You can register patients whose data is stored on the **Scheduler** or on the **Local Database**.

Depending on your configuration and work flow, the **Scheduler** may include "scheduled" patient data, which is entered using a connected HIS/RIS (Worklist) server, and/or "pre-registered" patient data, which is entered using the **Patient Registration** form on the ultrasound system. The **Local Database** includes patient data for previously seen patients. Registering previously seen patients is called "re-registering".



Instructions for Use

Pre-registering patients	Ch 5
Patient Registration form	Ch 5

Registering Pre-Registered Patients

Pre-registered patient data is entered using the **Patient Registration** form on the ultrasound system.

To register a pre-registered patient:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.
2. Double-click a patient folder or procedure from the **Scheduler** (or select the patient folder or procedure and then select **Register...** from the **Patient** menu at the top of the patient browser).

The system displays the **Patient Registration** form with the patient or procedure data.

3. Edit registration data as needed and then select the **OK** button on the lower left of the form.

Updating the Worklist (Retrieving HIS/RIS Data)

You can retrieve patient data from the connected HIS/RIS (Worklist) server by updating the Worklist. When you update the Worklist, the system queries the connected HIS/RIS (Worklist) server and then displays the scheduled patients on the **Scheduler** in the patient browser. If the **Scheduler** already lists patients, then the system appends additional scheduled patients to the existing list. You can update the Worklist manually or automatically.

Manual Updates

Use the patient browser to manually update the Worklist.

To manually update the Worklist:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.

The system displays the **Patient Browser** screen.

2. Choose one of the following methods to manually update the Worklist:
 - Select **Update Worklist** from the **Edit** menu.
 - Double-click the **Scheduler** graphic (in Tree View only).



System Reference

PATIENT DATA:
Tree View 1-5

Automatic Updates

Use the system presets to configure the interval (frequency) for automatic updates of the Worklist and to enable automatic updates for the Worklist.



Service Basic System

To configure the interval (frequency) for automatic updates:

Note: A change of this setting requires a system reboot.

1. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen.
2. Select **Service** on the left of the **Presets** screen, then select **Local Service**.
3. Delete any passwords in the **Please enter password** fields on the **Authentication** screen and then select **OK**.
4. Select the **Configuration** button on the **Home** menu screen.
5. Ensure that the **DICOM HIS/RIS** check box is selected on the **Configuration** screen and then select **Next**.
6. Select **HIS/RIS Nodes** (below the **DICOM** heading).
7. Select the host defined as the HIS/RIS (Worklist) server and then select **>** at the bottom of the screen.
8. Select the following: the logical name and the AE title for host defined as the HIS/RIS (Worklist) server. Ensure that the **Basic Worklist** check box is selected, and then enter the required value in the **Query Interval** textbox.

9. Select **Save**, select **Finish** (at the bottom of the screen), then select **Home** on the upper right of the screen.

The system displays a message indicating that a reboot is required.

10. Select **OK** in the message box.

To enable automatic updates of the Worklist:

1. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen.

The system displays the **Presets** screen.

2. Select **Basic System** on the left of the screen.
3. Select **Registration Configuration** in the **System Settings** section at the top of the screen.

The system displays the **Registration Configuration** dialog box.

4. Select the **HIS/RIS** tab of the **Registration Configuration** dialog box.

Note: The **HIS/RIS** tab is available only when a properly configured HIS/RIS server is connected to the system.

5. Select the **Update Worklist in Background** check box.
6. Select the **OK** button on the dialog box to save changes.
7. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen to exit the system presets.

Registering Scheduled Patients

Scheduled patient data is entered using a connected HIS/RIS (Worklist) server. When you select a scheduled procedure step for registration and then begin the examination, the system updates the SPS status to indicate that the examination has started.

To register a scheduled patient:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.
2. To limit registration data to one or more procedure steps, either double-click a procedure steps or select the procedure step(s) and then select **Register...** from the **Patient** menu at the top of the patient browser.
3. To limit registration data to a single procedure, double-click the procedure (or, if the patient folder contains only one procedure, double-click the patient folder). (Alternatively, select the procedure or patient folder and then select **Register...** from the **Patient** menu at the top of the patient browser.)

The system displays the **Patient Registration** form with the data for the selected procedure or procedure step.

4. Edit registration data as needed and then select the **OK** button on the lower left of the form.



System Reference

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Procedures and procedure steps	1-4
Study folders and series objects	1-4
Customizing the Patient Browser Screen	1-41

Re-Registering Patients

You can re-register a previously seen patient whose data is stored on the **Local Database**. When you re-register a patient, you either begin a new study or restart a previously completed study.

Note: Patient report data pertains to the current examination (study or series object) only.

Beginning a New Study

When you begin a new study, the system creates a new study folder within the patient folder.

To re-register a previously seen patient for a new study:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.
2. Select a patient folder from the **Local Database** and then select **Register...** from the **Patient** menu at the top of the patient browser.

The system displays the **Patient Registration** form with the patient data (no study type is indicated).

3. Edit registration data as needed and then select the **OK** button on the lower left of the form.

Restarting a Study

When you restart a previously completed study, the system creates a new series object within the study folder (which is within the patient folder). The system also changes the study date and time of all previous series objects to match that of the current examination (new series object).

Note: You can view the series date and time by configuring display of this information in the patient browser.

During the examination, the system displays all previously stored images (within other series objects of the selected study folder) on the **Review** task card, in addition to images stored during the current examination.

To re-register a previously seen patient for a new series object:

1. Press the **Browser** key on the keyboard or select the **Patient Browser** shortcut button at the bottom of the screen.
2. Select a study folder from the **Local Database** and then select **Register...** from the **Patient** menu at the top of the patient browser.

The system displays the **Patient Registration** form with the patient data, including the study type of the selected study folder.

3. Edit registration data as needed and then select the **OK** button on the lower left of the form.



Instructions for Use

Patient Registration
form

Ch 5

Printing Patient Images and Data

You can print images that are stored on the **Local Database**. You can also print the list of patient data that is displayed in the content section of the patient browser.

Printing Images

You can copy images from the **Local Database** to the **Filming** screen.

To print image(s) from the Local Database:

1. Select the image(s) (or the patient folder, study folder, or series object containing them) from the **Local Database** and then select **Copy to Film Sheet** from the **Patient** menu at the top of the patient browser.
The system displays a message requesting printer selection.
2. Select a printer and then select **Continue**.
The system copies the image(s) to the **Filming** screen.
3. To send the request to the printer from the patient browser:
 - a. Select **Expose Film Task** from the **Patient** menu at the top of the patient browser.
 - b. If the system displays a dialog box requesting that you select a film job for printing, then select a film job. The system displays this dialog box when the **Filming** screen contains more than one film job.
4. To send the request to the printer from the **Filming** screen:
 - a. Press the **Film** key on the keyboard to display the **Filming** screen.
 - b. Select the film job folder on the right of the screen that contains the copied image(s) and then select the **Expose Film Task** button on the **Filming** screen.



Instructions for Use

Printing and Storing
Images During the
Examination Ch 5



System Reference

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Data levels and data organization	1-3
Display level for Single View	1-45



The **Expose Film Task** button is located on the **Filming** screen.

Printing Patient Data Lists

You can print a list of patient data for any storage location available on the patient browser. Patient data lists include the data that is displayed in the content section of the patient browser. For the Single View layout, this data corresponds to the configured display level (such as studies).

For the Tree View layout, this data is one level lower than that of the patient data item selected in the navigation section. For example, when you select a patient folder in the navigation area, study folders are displayed in the content section, which are then printed in the patient data list.

The heading on a list of patients includes the name of the storage location and the print date and time. The heading for other lists corresponds to the information section of the patient browser. If the patient browser is in the Single View format, then the heading also contains the display level configured for Single View.

Print options for patient data lists are available when one or more printers are installed.

Note: When you select a series object in Tree View layout, image stamp display must be disabled for the printing options to be available. To disable image stamp display, select **Image Stamps** from the **View** menu at the top of the patient browser. The system replaces display of images with display of the image data.

The printed list uses the spacing displayed in the patient browser. Before you print, resize the column widths if needed for optimal display of data in the printed list.

Note: The list of patient data is always printed in English.

To print the content section of the patient browser:

- Select **Print List** from the **Patient** menu at the top of the patient browser.

The system automatically prints the list according to the settings in the **Print** dialog box last used since the system was powered on. The **Print** dialog box is displayed when you select **Print...** from the **Patient** menu at the top of the patient browser.

To print the content section of the patient browser, with changed printer settings:

1. Select **Print...** from the **Patient** menu located at the top of the patient browser and change settings as required.
2. Select the **Properties** button on the lower right of the displayed **Print** dialog box and change settings as required, then select the **OK** button at the bottom of the **Properties** dialog box.
3. Select the **OK** button at the bottom of the **Print** dialog box.

The system automatically prints the list according to the changed settings.

Previewing and Printing Images in the Filming Screen

You can delay printing of images by copying the images to the **Filming** screen. Use the system presets to configure print preferences so that the printing of images during an examination is delayed for later (manual) printing. Use the system presets to configure settings used in the **Filming** screen, such as the creation of a unique film job for each patient.

All images copied for a specific printer are contained in one film job folder within the **Filming** screen. Depending on the settings configured for the **Filming** screen, each film job folder may be limited to a single patient or may contain multiple patients. The system appends copied images to the film job folder containing the same patient (and designated for the same printer), if such a film job folder exists.

The **Filming** screen can accumulate up to three film jobs. You can customize printing options for a selected image, a film sheet (page of images), or an entire film job.

To access the Filming screen:

- Press the **Film** key located on the keyboard, or select the **Film Sheet** shortcut button at the bottom of the image screen.
The system displays the **Filming** screen.

Copying Images to the Filming Screen

You can copy stored images to the **Filming** screen from the current examination or from past examinations stored on the **Local Database**. Images can be copied to the **Filming** screen from either the **Review** task card or the patient browser.

When you copy images to the **Filming** screen, the system displays a message requesting printer selection. After you select a printer, the system copies the selected image(s) to the **Filming** screen and then displays them according to the layout configured for the selected printer.

Note: For images copied from the **Review** task card, the system displays the printer selection message only once per study. Images copied after the initial printer selection are automatically placed into the existing film job folder using the layout configured for the selected printer.



Print/Store



System Reference

PATIENT DATA:	
Configuring the Filming Screen Settings	1-26
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Configuring Print Preferences	Ch 1



The **Film** key is located on the keyboard.

To copy images from the Review task card to the Filming screen:

1. Select the image(s).
2. Select the **Copy to Film Sheet** button on the left of the screen.
The system displays a message requesting printer selection.
3. Select a printer and then select **Continue**.

To copy images from the patient browser to the Filming screen:

1. Select a patient data item (patient folder, study folder(s), series object(s), or image(s)) from the **Local Database**.
2. Select **Copy to Film Sheet** from the **Patient** menu at the top of the patient browser.
The system displays a message requesting printer selection.
3. Select a printer and then select **Continue**.

**System Reference**

PATIENT DATA:
Configuring the
Filming Screen
Settings 1-26

Processing of Print Request

When you end the current examination or review of a previous examination, the system processes print requests for each of the patient's film jobs from the examination/review session according to the first print-related action completed during the examination or review session for each film job:

First print action completed during examination/review session	Method
Press a PRINT/STORE key that is configured for printing	Follows the settings configured in the system presets for the pressed PRINT/STORE key.
Copy image(s) to the Filming screen from the Review task card	Automatically sends copied images to the designated printer.
Copy image(s) to the Filming screen from the patient browser	Does not print any images until you select the Expose Film Task button in the Filming task card.

Previewing and Selecting within the Filming Screen

You can preview images that have been copied to the **Filming** screen. You can select a film job folder and display pages (sheets) of images within the film job. The current page number and the total number of pages display on the upper right of the film sheet, next to the page corner icon.



*The page corner icon is located on the **Filming** screen.*

The system indicates selection in the following ways:

- Film job folder – highlighted in blue.
- Page of images – each image outlined with a solid blue border.
- Image – outlined with a solid blue border.

To select a film job folder:

- Roll the trackball to position the pointer on a film job folder on the upper right of the screen.

To select a page of images:

- Roll the trackball to position the cursor within the gray border of the page (film sheet) and then press the **SELECT** key.

To select one or more images:

- Roll the trackball to highlight each image and then press and hold the **Ctrl** key on the keyboard and the **SELECT** key on the control panel. To select consecutive images, roll the trackball to highlight the last image and then press and hold the **Shift** key on the keyboard and the **SELECT** key on the control panel.

To view the next page of images within the selected film job folder:

- Roll the trackball to position the pointer on the upper right of the page corner icon (located on the upper right of the screen) and then press the **SELECT** key.

To view the previous page of images within the selected film job folder:

- Roll the trackball to position the pointer on the lower left of the page corner icon (located on the upper right of the screen) and then press the **SELECT** key.

Printing Images from the Filming Screen

When you print images from the selected film job folder in the **Filming** screen, the system sends a request to the selected printer.

To print from the Filming screen, choose one of the following methods:

- Select the film job folder on the upper right of the **Filming** screen and then select the **Expose Film Task** button on the right of the screen.
- Access the **Review** task card and either select the **End Exam** button to end the examination for the currently registered patient or select the **Exit Review** button to end the review session. This method requires the following conditions:

If a patient is registered or if you are reviewing a previous examination, and the first print action completed during the examination or review session was copying images to the **Filming** screen from the **Review** task card, then you can also print the images (all images for the currently displayed patient) by ending the examination or review session, assuming that the patient's images are in one film job.



System Reference

PATIENT DATA:	
Processing of	
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Configuring the Filming Screen Settings

Use the system presets to configure the settings used for film jobs in the **Filming** screen.



Print/Store

Customizing Print Settings

You can prepare images for printing using the tab card located on the lower right of the **Filming** screen. Settings include:

- Film job layout (**Layout** tab)
- Image display settings (**Images** tab)
- Printer destination and film size (**Camera** tab)

These modifications override the configured **Filming** screen settings for the selected film job folder only. Other film job folders, if any, retain their original settings.

Changing the Layout

Images copied to the **Filming** screen use the layout configured for the selected printer. The layout determines the number of images printed on each page or film sheet. The more images per page in the layout, the smaller your images will print.

You can change the layout for the selected image(s), page(s), or film job folder. If you apply a layout to part of a film job folder, then the system places the reformatted images on the last film sheet(s) at the end of the film job, resulting in a new sequence of images.

To apply a layout:

1. Press the **Film** key located on the keyboard, or select the **Film Sheet** shortcut button at the bottom of the image screen.
2. Select a film job, page(s) of images, or image(s).
3. Select the icon representing the new layout (number of images per page) from the **Layout** tab.

Changing Image Display Options

You can hide image text and/or graphics and change other image display options on your printed images by using selections in the **Images** tab located on the **Filming** screen.

Note: Do not change the image display format from the factory default **Fit to Segment** (the only valid setting). Changing this selection from the factory default may cause errors during printing. The image display format buttons are at the bottom of the **Images** tab on the **Filming** screen.

Examples of image text include date, patient name, and transmit frequency. Examples of graphics include annotations, measurement calipers, and color bar velocity ranges. These display options apply to selected images only.

Note: Image text and graphics can be hidden and displayed on images that were stored as ultrasound images with overlays. Use the system presets to configure this output format.



System Reference

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Configuring the	
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The **Fit to Segment** button is located on the **Images** tab.



Print/Store

To apply an image text display format:

1. Select a film job, page(s) of images, or image(s).
2. Select the **Images** tab on the lower right of the screen.
3. Select the **All text** button to display previously hidden text, select the **Customized Text** button to display customized text, or select the **No text** button to hide text.

The system applies the text display format to your selection.



The **All Text** button is located on the **Images** tab.



The **Customized Text** button is located on the **Images** tab.



The **No Text** button is located on the **Images** tab.



The **Show Graphics** button is located on the **Images** tab.



The **Hide Graphics** button is located on the **Images** tab.

To apply a graphics display format:

1. Select a film job, page(s) of images, or image(s).
2. Select the **Images** tab on the lower right of the screen.
3. Select the **Show Graphics** button to display previously hidden graphics or select the **Hide Graphics** button to hide graphics.

The system applies the graphics display format to your selection.

Selecting a Printer Destination or Film Size

You can override the current printer selection or film size using the **Camera** tab located on the **Filming** screen. The change applies to the selected film job only, not to subsequent film jobs.

To select a printer destination:

1. Select the film job.
2. Select the **Camera** tab on the lower right of the screen.
3. Select the required printer from the **Camera** drop-down list.

To select a film size:

1. Select the film job.
2. Select the **Camera** tab on the lower right of the screen.
3. Select a film size from the **Film** drop-down list.

Displaying Film Job Information

You can view the list of film jobs that were sent to a selected printer. Film jobs sent to a DICOM printer are listed in the **Film Task Status** dialog box. Film jobs sent to an on-board printer are listed in the related Windows printer status dialog box.

To view the list of film jobs sent to a printer:

1. Select the **Film Task Status** button on the right of the screen.
The system displays the **Film Task Status** dialog box.
2. To view the list of film jobs for a DICOM printer, select the printer icon at the top of the **Film Task Status** dialog box.
The system lists the film jobs sent to the selected DICOM printer.
3. To view the list of film jobs for an on-board printer, select the printer icon at the top of the **Film Task Status** dialog box.
The system displays a Windows printer status dialog box for the selected on-board printer.



The **Film Task Status** button is located on the **Filming** screen.

Deleting Images from the Filming Screen

You can delete images from the **Filming** screen. Images are deleted from the screen only; stored images are unaffected.

To delete images from the Filming screen:

1. Select the film job, page(s) of images, or image(s).
2. Select the **Delete** button.



The **Delete** button is located on the **Filming** screen.

Managing and Maintaining Patient Data

All patient data is accessible from the patient browser. Using the patient browser, you can transfer patient data to other devices, delete or protect patient data, mark patient data for later retrieval, change work flow status, or correct or rearrange items of patient data.

Transferring Patient Data

Transfer operations include archiving, sending, exporting, and importing. With the exception of importing, transfer operations are available for patient data stored on the **Local Database** only. You can import data from an inserted CD or from a directory on the system's hard disk. The system copies the patient data to the **Local Database**.

During a transfer, the system copies the patient data to the specified destination. When the transfer is complete, the system updates the work status for the patient data on the **Local Database** to indicate the type of transfer completed.

When you select patient data for transfer, you can select one or more patient folders, study folders, series objects, or images.

Use the system presets to complete the following configurations:

- Specify available transfer operations for the CD drive and connected devices.
- Configure preconditions for data transfer, automatic transfer of patient data, and automatic deletion of transferred studies.
- Allow or disallow archival to span across CDs if the CD does not have space for all of the data to be transferred for a specific patient.




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Service Print/Store Basic System

Archiving Patient Data

 **Caution:** To prevent corruption of data stored on an inserted CD, do not interrupt the archiving process.

You can archive patient data to an archive device. If the compact disk (CD) drive is configured as an archive device, then you can archive to CD.

To archive patient data to an inserted CD:

1. Select patient data stored on the **Local Database**.
2. Select **Archive to CD-R** from the **Transfer** menu at the top of the patient browser.

To archive patient data to an archive device:

1. Select patient data stored on the **Local Database**.
2. Select **Archive to...** from the **Transfer** menu at the top of the patient browser.

The system displays the **Archive To** dialog box, listing archive devices.

3. Select the destination and then select the **Archive** button on the lower left of the dialog box.

Sending Patient Data

You can send patient data to a storage device.

To send patient data (transfer data to a storage device):

1. Select patient data stored on the **Local Database**.
2. Select **Send to...** from the **Transfer** menu at the top of the patient browser.

The system displays the **Send To** dialog box, listing storage devices.

3. Select the destination and then select the **Send** button on the lower left of the dialog box.

Exporting Patient Data

You can export patient data to an offline device or to a directory on the system's hard disk. If the compact disk (CD) drive is configured as an offline device, then you can export to CD.

To export patient data to an offline device:

1. Select patient data stored on the **Local Database**.
2. Select **Export to...** from the **Transfer** menu at the top of the patient browser.

The system displays the **Export To** dialog box, listing offline devices.

3. Select the destination and then select the **Export** button on the lower left of the dialog box.

To export patient data to a directory on the system's hard disk:

Note: Directories on the system's hard disk are not visible in the patient browser.

1. Select patient data stored on the **Local Database**.
2. Select **Export to Off-line...** from the **Transfer** menu at the top of the patient browser.

The system displays the **Export to Off-line** dialog box.

3. Select the following:
 - Destination directory from the **Path** drop-down menu
 - Image format from the **Select Format** drop-down menu
 - **Export** settings that you want to enable for the bitmap image format
4. Select the **OK** button on the dialog box.

Importing Patient Data

You can import patient data from the inserted CD or from a directory on the system's hard disk. The system imports the data to the **Local Database**.

To import patient data from the inserted CD:


1. Select patient data stored on the **CD-R_READ**.
2. Select **Import** from the **Transfer** menu at the top of the patient browser.

To import patient data from a directory on the system's hard disk:

Note: Directories on the system's hard disk are not visible in the patient browser.

1. Select **Import from Off-line...** from the **Transfer** menu at the top of the patient browser.
The system displays the **Import from Off-line** dialog box.
2. Select the destination directory from the **Path** drop-down list and then select one or more files.
3. Select the **OK** button on the dialog box.

Deleting Patient Data

 **Caution:** To prevent corruption of data stored on an inserted CD, do not interrupt the archiving process. Do not delete archived patient data from the local database until the archiving process is complete and the inserted CD is determined to be full (or no more archiving is planned for the inserted CD).

You can delete unprotected patient data that is stored on the **Local Database**. When you delete patient data, the system removes all contents of the selected item. For example, if you delete a study folder, the system removes all series objects and images contained in the study folder.

Note: Deletion from the patient browser is prevented when related patient data at a lower or higher data level is protected. For example, protection of a series object prevents deletion of the related study folder. This status does not prevent deletion of an unrelated study folder within this patient folder.

Note: On systems connected to a HIS/RIS server, patient data is not qualified for deletion unless its MPPS status is "DISCONTINUED" or "COMPLETED". If the HIS/RIS server supports MPPS and has been configured for "performed procedure steps", this MPPS status must also be received by the HIS/RIS server before the patient data qualifies for deletion.

To delete the selected item of patient data on the Local Database:

- Select **Delete** from the **Edit** menu at the top of the patient browser. Alternatively, press the **NEXT** key on the control panel and then select **Delete** from the displayed shortcut menu.



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Protecting Patient Data

You can enable and disable protection for patient data that is stored on the **Local Database**. Protection prevents deletion, correction, or rearrangement from the patient browser. Protection status applies to the selected item of patient data and any related data in higher or lower data levels, even if protection status is not assigned. For example, if you enable protection for a study folder, then the system does not allow deletion, correction, or rearranging of the related patient folder, series objects, or images.

Note: Protection assigned from within the patient browser does not prevent deletion from the **Review** task card.

When you enable or disable protection for patient data, the system updates the mark status.

To enable protection for the selected item of patient data on the Local Database:

- Select **Protect** from the **Edit** menu at the top of the patient browser. Alternatively, press the **NEXT** key on the control panel and then select **Protect** from the displayed shortcut menu.

To disable protection for the selected item of patient data on the Local Database:

- Select **Unprotect** from the **Edit** menu at the top of the patient browser. Alternatively, press the **NEXT** key on the control panel and then select **Remove Protection** from the displayed shortcut menu.



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Identifying Patient Data for Later Retrieval

You can identify (mark) patient data for later retrieval. When you mark patient data, the system updates the mark status.

To mark the selected patient data:

- Select **Mark** from the **Edit** menu at the top of the patient browser.

To unmark the selected patient data:

- Select **Unmark** from the **Edit** menu at the top of the patient browser.

Changing the Work Flow Status

The stages of work flow status are "completed", "read", and "verified". You can change the work flow status of a study folder or series object stored on the **Local Database**. When you change work flow status, the system updates the work status and places a mark to the left of the selected work flow status in the **Set State** submenu of the **Edit** menu. Your changes apply to the selected item of patient data only; related items in higher or lower data levels are unaffected.

Use the **Browser Configuration** window to enable display of work status and to configure the display level for the Single View layout.

To change the work flow status:

Note: For work flow status changes in the Single View layout, the configured display level must be for study folders or series objects.

1. Select a study folder or series object.
2. Select patient data stored on the **Local Database**.
3. Select **Set State >** from the **Edit** menu at the top of the patient browser, then select a work flow status.



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Specifying work flow status for automatic transfer	Ch 1

Editing and Sending MPPS Data

You can edit the MPPS description, action codes, billing information, and other MPPS data. For the currently registered patient, you can discontinue the examination or complete the examination.

The system exits the **Modality Performed Procedure Step** dialog box when you discontinue the examination, complete the examination, send edits, or save edits.

When you send edits, discontinue the examination, or complete the examination, the system sends the updated edits and/or status to the connected HIS/RIS (Worklist) server.

When you save edits, the system saves the edits to the hard disk.

The system does not end a discontinued or completed examination. You must end the examination by selecting the **End Exam** button in the **Review** task card or by registering another patient.

Note: When you end an examination, the system automatically updates the status to "completed" and sends the updated status to the connected HIS/RIS (Worklist) server.

To edit MPPS data:

1. Press the **Browser** key on the keyboard to access the patient browser.
2. Select a patient folder, study folder, or series object. If the patient folder contains multiple study folders and/or series objects, then select the required study folder or series object.
3. Select **Show MPPS** from the **Patient** menu at the top of the patient browser.

The system displays the **Modality Performed Procedure Step** dialog box.

4. Edit the required fields.
5. To discontinue the examination, select the **Discontinue** button.
6. To complete the examination, select the **Complete** button.
7. To send edits, select the **Send** button.

Note: The **Send** button is available when a connected device is configured for the "performed procedure step" DICOM service.

8. To save edits, select the **Save** button.

Note: The **Save** button becomes available after you make at least one edit and then position the cursor in another field.

9. To exit the **Modality Performed Procedure Step** dialog box without making any changes, select **Cancel**.

Correcting, Merging, and Rearranging Patient Data

You can correct unprotected patient data that is stored on the **Local Database**. You can merge the currently registered patient with patient data for another patient, and you can rearrange patient data items for the currently registered patient by placing the items in a patient data item for a previous examination.

Note: Siemens recommends that you do not modify patient data if it has already been transferred to other devices, such as a CD or workstation.

When you correct, merge, or rearrange patient data, the system records the new and old attribute(s) to a history log file and updates the work status for the patient data to indicate attachment of the history log file.

The history log file is attached to the selected patient data item except in cases of rearrangement in which the destination was the same data level as the original location. In these cases, the system rearranges the contained items only, and then attaches a history log file to each contained item. For example, if you rearrange a study folder by placing it into another study folder, then the system rearranges the contained series objects only and attaches a history log file to each rearranged series object.



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Correcting Patient Data

Corrections consist of added or edited information, such as patient name or study comment.

Note: Patient/study identification information can be corrected during the examination only, for patient data that was entered on the ultrasound system only (not retrieved from a HIS/RIS [Worklist] server). Patient/study identification information includes patient name, ID, date of birth, sex, accession number, and study ID.

To correct patient data:

1. Select an item of patient data (patient folder, study folder, series object, or image) from the **Local Database** on the patient browser.
2. Select **Correct** from the **Edit** menu located at the top of the patient browser to display the **Correct** dialog box.
3. Enter your name into the **Modifier's Name** text box, or select your name from the drop-down list.
4. Select and edit the fields of the **Correct** dialog box and then select the **OK** button.

Merging Patient Data

The merge operation consists of combining patient information from two patient folders. You can initiate the merge operation by correcting patient data so that the patient name, ID, and date of birth match those of another patient folder. When the system detects identical patient name, ID, and date of birth in separate patient folders, the system displays a message requesting confirmation of the merge operation.

To qualify for the merge operation, patient data must have been entered on the ultrasound system (not retrieved from a HIS/RIS [Worklist] server). Patient data can be merged during the examination only.

To merge the patient folder for the currently registered patient with another patient folder:

1. Make a note of the patient name, ID, and date of birth listed in the patient folder from the **Local Database** that has the correct information.
2. Select the patient folder for the currently registered patient from the **Local Database** on the patient browser.
3. Select **Correct** from the **Edit** menu located at the top of the patient browser to display the **Correct** dialog box.
4. Enter your name into the **Modifier's Name** text box, or select your name from the drop-down list.
5. Select and edit the fields of the **Correct** dialog box, ensuring that the patient name, ID, and date of birth match those listed in the patient folder that has the correct information.

6. Select the **OK** button.

The system displays a confirmation message for the merge operation.

Note: The merge operation requires that data is of the same modality (ultrasound, CT, etc.). Modality is sometimes referred to as "equipment" in error messages. The system merges patient data only if no inconsistency occurs during the built-in system checks.

7. Confirm the merge operation.

Rearranging Patient Data

Patient data is rearranged when you move an item of patient data for the currently registered patient from its original location to another. The selected item (original location) can be the currently registered patient's patient folder, study folder, series object, or image. The destination must be at either the same data level as or one data level higher than the selected item (an image cannot be a destination).

For example, you can move a series object into another series object, or an image into another series object, but you cannot move an image into a study folder because these items are separated by two data levels. You cannot move a study folder into a series object because the destination is of a lower data level.

Note: If the original location and the destination for rearranged data are at the same data level, then the system disregards the protection status of the destination, moves the contents of the selected item only, and discards the empty item. For example, if you rearrange an "Abdomen" study folder (unprotected) into an "OB" study folder (protected), then the system rearranges the contained series object(s) only, then discards the empty "Abdomen" study folder.

You can rearrange patient data using menu options (**Cut** and **Paste** from the **Edit** menu at the top of the patient browser) or the "drag-and-drop" technique.

To rearrange patient data for the currently registered patient:

Note: The rearrange operation requires that data is of the same modality (ultrasound, CT, etc.). Modality is sometimes referred to as "equipment" in error messages. The system rearranges patient data only if no inconsistency occurs during the built-in system checks.

1. To use the menu options method for rearrangement:
 - a. Select an item of patient data (patient folder, study folder, series object, or image) for the currently registered patient from the **Local Database** on the patient browser.
 - b. Select **Cut** from the **Edit** menu located at the top of the patient browser to display the **Correct** dialog box.
 - c. Select the destination (patient folder, study folder, or series object), and then select **Paste** from the **Edit** menu.

The system displays the **Rearrange** dialog box.

2. To use the "drag-and-drop" technique for rearrangement:
 - a. Select an item of patient data (patient folder, study folder, series object, or image) for the currently registered patient from the **Local Database** on the patient browser.
 - b. Press and hold the **SELECT** key while rolling the trackball to reposition the pointer over the destination (patient folder, study folder, or series object).
 - c. When the pointer is positioned over the destination, release the **SELECT** key.

The system displays the **Rearrange** dialog box.

3. Enter your name into the **Modifier's Name** text box of the **Rearrange** dialog box, or select your name from the drop-down list.

The system displays a confirmation message for the rearrange operation.

4. Press the **Enter** key on the keyboard to confirm the rearrange operation.

Viewing the History of Corrections and Rearrangements

You can view the history of corrections and rearrangements made for patient data that is stored on the **Local Database**. The system displays new and old attributes within the **Correct & Rearrange History** window.

Note: Because each level of patient data (such as a patient folder or study folder) lists specific fields, history of changes made for a patient in one level (such as patient folder) may not be visible in another level (such as study folder).

To view the history of corrections and rearrangements for the selected patient data:

- Select **History** from the **Edit** menu at the top of the patient browser.

Customizing the Patient Browser Screen

You can choose the layout and configure the display of the patient browser.

Choosing the Layout

You can choose either Single View or Tree View layout for a specific organization of the data levels within the patient browser.

When you activate the Tree View layout, the system places a mark to the left of the **Tree** option in the **View** menu at the top of the patient browser. When you activate the Single View layout, the system removes this mark.

To toggle Single View with Tree View:

- Select **Tree** from the **View** menu at the top of the patient browser.



System Reference

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Single View display level	1-45

Repositioning Toolbar Components

A component of a toolbar is a set of toolbar buttons. A vertical line separates each toolbar component.

To reposition a toolbar component:

1. Roll the trackball to position the trackball pointer over the toolbar component (not over any toolbar button).
2. Press and hold the **SELECT** key on the control panel and then roll the trackball to reposition the selected toolbar component.

Adjusting Section Sizes

To adjust the relative sizes of the content section and navigation section:

1. Roll the trackball to position the pointer over the boundary between the content section and navigation section.

The pointer changes its shape to a double-headed vertical arrow placed at the midpoint of a horizontal line.
2. Press the **SELECT** key on the control panel and roll the trackball to adjust the size of the sections and then release the **SELECT** key.

Resizing columns in the content section

To resize a column in the content section:

1. Roll the trackball to position the pointer over the right boundary of the column heading.

The pointer changes its shape to a double-headed horizontal arrow placed at the midpoint of a vertical line.
2. Press the **SELECT** key on the control panel and roll the trackball to adjust the column size and then release the **SELECT** key.

Hiding Data Levels (Tree View)

To hide data levels from the Tree View layout:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **Tree View** tab of the **Browser Configuration** window.
3. Select a storage location from the drop-down list on the upper left of the window.
4. Select a data level from the upper right and then select the **Hide** check box below the data levels.

Note: You can configure the patient browser to hide one or more of the following data levels from the Tree View layout: study folder, series object, image, procedure step, or action item.

5. Select the **OK** button on the dialog box.

Enabling or Disabling the Display of Browser Elements

You can enable the display of the following elements within the patient browser:

To enable display of the following items:

- Use the following instructions.

To enable:	Do this...
Icon display for series objects and images	Select Image Stamps from the View menu located at the top of the patient browser so that the system places a mark to the left of the selected menu option.
List display for series objects and images	Select Image Stamps from the View menu located at the top of the patient browser so that the system removes the mark to the left of the selected menu option.
The toolbar	Select Toolbar from the View menu located at the top of the patient browser so that the system places a mark to the left of the selected menu option.
The information section	Select Info Area from the View menu located at the top of the patient browser so that the system places a mark to the left of the selected menu option.
A storage location graphic	Select Source from the View menu located at the top of the patient browser and then select a storage location so that the system places a mark to the left of the selected submenu option.

Displaying Buttons on the Toolbar

To add buttons to or remove buttons from the toolbar:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **General** tab of the **Browser Configuration** window.
3. To add a button to the toolbar, double-click the button in the **Tool Pool** section of the window, or select the button and then select the down-arrow.

The system displays buttons in the toolbar by the order in which you add them.

4. To remove a button from the toolbar, double-click the button in the **Tool Bar** section at the bottom of the window, or select the button and then select the up-arrow.
5. To select multiple nonconsecutive buttons, press and hold the **Ctrl** key on the keyboard while you select each button in the **Tool Pool** section, then release the **Ctrl** key and select the down-arrow or up-arrow.
6. To select multiple consecutive buttons (left to right), press and hold the **Shift** key on the keyboard while you select each heading in the **Tool Pool** section, then release the **Shift** key and select the down-arrow or up-arrow.
7. Select the **OK** button on the lower left of the window.

Displaying Headings in the Content Section

To select headings for display in the content section:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **Tree View** tab or **Single View** tab of the **Browser Configuration** window.
3. Select a storage location from the drop-down list on the upper left of the window and then select a level of data to the right of the storage location.

Note: To select a data level for configuration in the **Tree View** tab, select the related graphic at the top of the window; in the **Single View** tab, select a data level from the **Level** drop-down list on the upper right of the window.

4. To configure a heading for display in the content section, double-click the heading displayed in the **Heading Pool** section near the top of the window (or select the heading and then select the down-arrow).

The system displays headings by the order in which you add them.

5. To remove a heading from display (displayed in the **Heading Settings** section at the bottom of the window), double-click the heading, or select the heading and then select the up-arrow.
6. To select multiple nonconsecutive headings, press and hold the **Ctrl** key on the keyboard while you select each heading in the **Heading Pool** section, then release the **Ctrl** key and select the down-arrow or up-arrow.
7. To select multiple consecutive headings (left to right), press and hold the **Shift** key on the keyboard while you select each heading in the **Heading Pool** section, then release the **Shift** key and select the down-arrow or up-arrow.
8. Select the **OK** button on the window.

Specifying Labels for Series or Image Icons (Tree View)

To specify labels for series or image icons (Tree View only):

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **Tree View** tab of the **Browser Configuration** window.
3. Select **Database** from the drop-down list on the upper left of the window and then select either **Series** or **Instance** from the upper right.
4. Select **Icon Configuration** on the upper left of the window (below **Database**).

5. Select a heading from the **Heading Pool** section at the top of the window and then select the down-arrow.

The system places the selected heading in the **Icon Labels** section at the bottom of the window.

6. If required, select another heading from the **Heading Pool** section at the top of the window and then select the down-arrow.

The system places the selected heading in the **Icon Labels** section at the bottom of the window.

Note: The maximum number of icon labels allowed is two.

7. Select the **OK** button on the window.

Selecting the Patient Data Display Level (Single View)

To select the display level of patient data for Single View layout:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **Single View** tab of the **Browser Configuration** window.
3. Select a **Display Level** at the top of the window.
4. Select the **OK** button at the lower left of the window.

Displaying Work Status

To specify the work status to be displayed:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **General** tab of the **Browser Configuration** window.
3. Select the **Shown work status** check boxes at the top of the window.
4. Select the **OK** button at the lower left of the window.

Confirming Deletion

You can specify the work conditions that allows deletion of patient data. You can also enable display of a confirmation message for deletion of patient data.

To specify the work status conditions that allow deletion without the second Delete Confirmation message:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **General** tab of the **Browser Configuration** window.
3. Select the **Permit delete if** check boxes at the top of the window.
4. Select the **OK** button at the lower left of the window.

To display a confirmation message for deletion:

1. Select **Configure Browser** from the **Options** menu at the top of the patient browser.
2. Select the **General** tab of the **Browser Configuration** window.
3. Select the **Confirm Deletion** check box on the upper left of the window.
4. Select the **OK** button at the lower left of the window.

Patient Browser Shortcut Menus

When you select patient data in the patient browser and then press the **NEXT** key on the control panel, the system displays a shortcut menu. The options available depend on the type of patient data selected.

Shortcut Menu Selection	Description
Open Subtree (available for patient folders in Tree View layout only)	Displays all series objects for the selected patient folder.
Close Subtree (available for patient folders and study folders in Tree View layout only)	Removes display of series objects for the selected patient folder.
Delete	Removes the selected patient data from the current storage location.
Protect	Assigns protection work status to the selected patient data. Protection work status on any objects in the lower or higher data levels prevents deletion. For example, protection work status for a series object prevents deletion of the related patient folder. An unprotected, unrelated series object on this same patient folder can be deleted, however.
Remove Protection	Removes protection work status from the selected patient data.
Mark	Assigns mark ("bookmark") work status to the selected patient data.
Unmark	Removes mark work status from the selected patient data.

Status Indicators

The system displays and tracks the following types of status indicators:

- **Work Status** – indicates processing stages and corrections (for patient data on the **Local Database** only).
- **Mark Status** – indicates whether data is marked.
- **MPPS Status** – indicates Modality Performed Procedure Step processing stage (for patient data on the **Local Database** only).
- **SPS Status** – indicates the progress of a procedure step scheduled on a connected HIS/RIS server (for patient data on the **Scheduler** only).

If configured for display, status indicators display in the content section and to the right of each patient folder, study folder, and series object in the navigation section when the patient browser is in Tree View layout.

Work Status Legend

The work status includes a field for each type of status. For example:
R/com/P/a/ / /H

Note: The work status indicators **AC**, **AV**, and **SC** are displayed at the image data level only.

As described below in the list of indications and legends, this example of a work status (R/com/P/a/ / /H) indicates that the patient data has been entirely received, completed, entirely printed, partly archived, not sent, not exported, and has history available.



System Reference

PATIENT DATA:	
Selecting information to be displayed in the content section	1-44
Tree View	1-5
Devices Used for Data Transfer	Ch 2

Field (Work Status)	Indication	Legend
Received	Patient data has been received.	<ul style="list-style-type: none"> ▪ R/: All data Received ▪ r/: Only parts received ▪ /: No data received
Work Flow	Patient data has reached the indicated stage in the examination/editing process.	<ul style="list-style-type: none"> ▪ /com/: Study or series has been completed ▪ /real/: Study or series has been read or reassessed ▪ /ver/: Study or series has been verified
Printed	Patient data has been printed.	<ul style="list-style-type: none"> ▪ /P/: All data Printed ▪ /p/: Only partly printed ▪ / /: No data printed
Archived	Patient data has been transferred to an archive device.	<ul style="list-style-type: none"> ▪ /AC/: Archived and Committed from an archive node ▪ /Af/: Archived but commitment failed ▪ /A?/: Archived and waiting to be committed from an archive node ▪ /AV/: Archived and Verified on a local device ▪ /A/: All data archived ▪ /a/: Only partly archived ▪ / /: Not archived
Sent	Patient data has been transferred to a storage device.	<ul style="list-style-type: none"> ▪ /SC/: Sent and Committed from a network node ▪ /Sf/: Sent but commitment failed ▪ /S?/: Sent and waiting to be committed from a network node ▪ /S/: All data Sent ▪ /s/: sent ▪ / /: No data sent
History available	Patient data has a history of modifications, such as correction of the patient name or rearrangement of images.	<ul style="list-style-type: none"> ▪ /H: History available ▪ /: No history available, no changes have been made

Note: You can edit the **Work Flow** status for selected study folder(s) or series object(s) only.

Mark Status Legend

The mark status includes a field for each type of status. For example: Prot/M

As described below in the list of indications and legends, this example of a mark status (Prot/M) indicates that the patient data is delete-protected and is marked or later retrieval.

Field (Mark Status)	Indication	Legend
Delete protected	Patient data is protected against deletion.	<ul style="list-style-type: none">▪ prot/: Patient data is protected▪ /: Patient data is not protected
Mark	Patient data is marked for later retrieval.	<ul style="list-style-type: none">▪ /M: Patient data is marked▪ /m: Not all frames of a multiframe object are marked.▪ /: Patient data is not marked

MPPS Status Legend

The MPPS status includes a field for each type of status. For example:
IN PROGRESS/HIS/s

Note: The second and third MPPS fields (**Creation of SPS** and **Feedback**) are displayed for series objects only.

As described below in the list of indications and legends, this example of a MPPS status (IN PROGRESS/HIS/s) indicates that the procedure step has begun but is not yet completed, the corresponding procedure step was scheduled by the HIS/RIS, and information was successfully sent that the procedure step is in progress.

Field (MPPS Status)	Indication	Legend
Work flow	Patient data has reached an MPPS stage.	<ul style="list-style-type: none"> ▪ IN PROGRESS/: The procedure step has begun but is not yet completed ▪ COMPLETED/: The procedure step is finished ▪ DISCONTINUED/: The procedure step was interrupted before being complete ▪ OPEN/: At least one subordinate MPPS is not yet completed (applies to patient/study level only) ▪ DONE/: All subordinate MPPS are completed (applies to patient/study level only) ▪ /: No MPPS available
Creation of SPS Note: This field is displayed for series objects only.	The corresponding procedure step was scheduled at the named location.	<ul style="list-style-type: none"> ▪ /HIS/: The corresponding performance step was scheduled by the HIS/RIS ▪ /LOC/: The corresponding performance step was scheduled (pre-registered) locally, on the ultrasound system ▪ /: No information available; patient folder or study folder is selected.
Feedback Note: This field is displayed for series objects only.	Information was sent to the HIS/RIS about the progress of the procedure step.	<ul style="list-style-type: none"> ▪ /s: Information was successfully sent that the procedure step is in progress ▪ /S: Information was successfully sent that the procedure step is completed or discontinued ▪ /: No information sent

SPS Status Legend

The SPS status includes one field. For example: SCH

As described below in the list of indications and legends, this example of a SPS status (SCH) indicates that the scheduled procedure step (examination) has been scheduled by HIS/RIS.

Field (SPS Status)	Indication	Legend
SPS Status	Progress of a scheduled procedure step.	<ul style="list-style-type: none">SCH: Examination scheduled by HIS/RISARR: Arrived – patient examination has started" ": No SPS status set

2 Documentation Devices

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Compact Disk CD-R Drive

Only use CD-R (recordable compact disks) with the ultrasound system. The following brands have been validated for use with the system: Imation, Maxell, Sony, and TDK.

Installing Documentation Devices

This section describes connection and setup of supported documentation devices for the ultrasound system. Available documentation device options include:

- Black and white printer, (3" x 4" [A6] format).
- Color printer (5" x 7" [A5] or 3" x 4" [A6] format).
- Videocassette recorder (VCR) with either NTSC or PAL format.

 **WARNING:** Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

Note: Only authorized Siemens representatives are permitted to install documentation devices on-board the ultrasound system.

On-board vs. off-board documentation devices

On-board documentation devices must be installed by authorized Siemens representatives.

Off-board documentation devices are user installable.

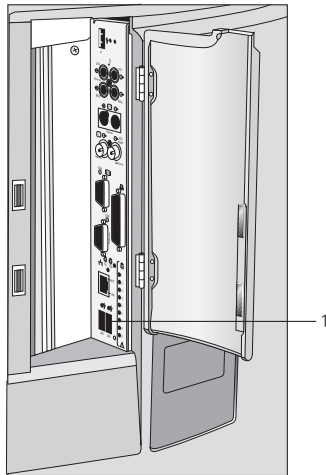
An off-board documentation device has a data cable connecting it to the ultrasound system, but is connected to AC power separate from the ultrasound system. An off-board documentation device is located separately, for example: on a table next to the ultrasound system.

Up to three documentation devices in total may be connected to the ultrasound system. All installed documentation devices may be controlled from the ultrasound system.

The following configurations are supported:

- One off-board device and two on-board devices.
- Up to two off-board devices and one on-board device.
- Up to three off-board devices when there are no on-board devices.

Installing Off-Board Printers



I/O panel with printer connection.

- 1 Connect the USB end of the parallel-to-USB cable to the correct USB port.

Off-Board Mitsubishi P91DW Printer

The Mitsubishi P91DW printer is a black and white thermal printer.

To connect the printer to the ultrasound system:

⚠ WARNING: Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

1. Power on (⏻) the ultrasound system and wait for the operating system to finish loading.
2. Ensure that the printer is powered off. (The power switch is located on the front of the printer.)
3. Plug the Printer AC power cord into the back of the printer and plug the other end into an AC power outlet that is not located on the ultrasound system.
4. Locate the DIP switches numbered one through four in the upper left of the printer rear panel.
 - Set DIP switch number one to the on (up) position.
 - Set DIP switches numbered two through four to the off (down) position.
5. Open the door to the I/O panel.
6. Route the parallel-to-USB cable through the opening in the top of the ultrasound system and into the cable channel. The cable will emerge above the I/O panel.
7. Plug the parallel connector into the back of the printer.
8. Locate the USB port on the ultrasound system I/O panel and connect the USB end of the parallel-to-USB cable to the USB port.
9. Power on the printer.



DIP switches on P91DW.

Off-Board Mitsubishi CP800DW Printer

The Mitsubishi CP800DW printer is a color thermal printer.

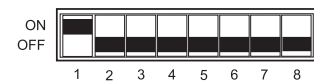
To connect the printer to the ultrasound system:

⚠ WARNING: Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

1. Power on (⏻) the ultrasound system and wait for the operating system to finish loading.
2. Ensure that the printer is powered off. (The power switch is located on the front of the printer.)
3. Plug the Printer AC power cord into the back of the printer and plug the other end into an AC power outlet that is not located on the ultrasound system.
4. Locate the DIP switches numbered one through eight in the upper left corner of the printer rear panel.

Set DIP switch number one to the on (up) position.

Set DIP switches numbered two through eight to the off (down) position.



DIP switches on CP800DW.

5. Open the door to the I/O panel.
6. Route the parallel-to-USB cable through opening in the top of ultrasound system and into the cable channel. The cable will emerge above the I/O panel.
7. Plug the parallel connector into the back of the printer.
8. Locate the USB port on the ultrasound system I/O panel and connect the USB end of the parallel-to-USB cable to the USB port.
9. Power on the printer and wait 15 seconds before printing.

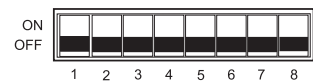
Off-Board Mitsubishi CP770DW Printer

The Mitsubishi CP770DW printer is a color thermal printer.

To connect the printer to the ultrasound system:

⚠ WARNING: Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

1. Power on (⏻) the ultrasound system and wait for the operating system to finish loading.
2. Ensure that the printer is powered off. (The power switch is located on the front of the printer.)
3. Plug the Printer AC power cord into the back of the printer and plug the other end into an AC power outlet that is not located on the ultrasound system.
4. Locate the DIP switches numbered one through eight in the upper left corner of the printer rear panel and set them all to off (down).
5. Open the door to the I/O panel.
6. Route the parallel-to-USB cable through the opening in the top of the ultrasound system and into the cable channel. The cable will emerge above the I/O panel.
7. Plug the parallel connector into the back of the printer.
8. Locate the USB port on the ultrasound system I/O panel and connect the USB end of the parallel-to-USB cable to the USB port.
9. Power on the printer and wait 15 seconds before printing.



DIP switches on CP770DW.

Report Printers

⚠ WARNING: Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output port configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

⚠ WARNING: Equipment connected to the ultrasound system and in the patient environment must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can result in chassis leakage currents exceeding safe levels. Chassis leakage current created by an accessory or device connected to a non-isolated outlet may add to the chassis leakage current of the ultrasound system.

⚠ WARNING: Non-medical grade report printers cannot be used within a patient environment,

⚠ WARNING: During use of a non-medical grade report printer or when a non-medical grade report printer is connected to the ultrasound system, the ultrasound system cannot in any way be in contact with a patient.

Relevant standards for some non-medical electrical equipment may have limits for enclosure leakage currents higher than required by medical standards. These higher standards are acceptable only outside the patient environment. It is essential to reduce enclosure leakage currents when non-medical electrical equipment is to be used within the patient environment. Measures for reducing leakage current include use of a medically-approved isolation transformer.

The ultrasound system has printer drivers compatible with non-medical grade report printers. Siemens does not guarantee the performance and safety of any non-medical grade report printer. Non-medical grade report printers do not fulfill the following safety requirements:

- EN 60601-1-1 and IEC 60601-1-1 (Medical Electrical Equipment, Part 1: General Requirements for Safety).
- EN 60601-1-2 and IEC 60601-1-2 (Electromagnetic Compatibility of Medical Devices).



System Reference

RESOURCES:

Accessories and
Options

Ch 2

If a non-medical grade report printer is to be used with the ultrasound system, then you must ensure mitigation is provided to meet all safety requirements. It is the responsibility of the user to ensure that the ultrasound system in combination with the non-medical grade report printer complies with safety requirements.

- Always use a medically-approved isolation transformer with a non-medical grade report printer.
- Mitigate risk with regard to the Electromagnetic Compatibility of Medical Devices requirement. A non-medical grade device must be designed, manufactured, and certified to meet the same EMC (electromagnetic compatibility) requirements as the ultrasound system, or other means must ensure that the overall EMC requirements are met.

Mitigating the Risk of Connecting a Report Printer

To fulfill EN 60601-1-1 and IEC 60601-1-1 (Medical Electrical Equipment, Part 1: General Requirements for Safety) requirements for non-medical peripheral equipment:

- The non-medical peripheral equipment must be approved according to any other EN or IEC standard (EN XXXXX or IEC XXXXX, e.g., equipment complying with EN 60348 and IEC 60348, EN 60950 and IEC 60950, etc.).
- The connection of non-medical peripheral equipment to your ultrasound system must adhere to the following conditions:
 1. Connect the ultrasound system to an AC power outlet within a medically used room within the patient environment. A patient environment is defined as an area in which medical examination, monitoring, or treatment of the patient takes place. The patient environment is located 1.5 meters (1.8 meters [6 feet] in Canada and the U.S.A.) around the patient location.
 2. Connect the peripheral equipment AC power cable to medically approved isolation transformer.
 3. Connect the medically approved isolation transformer to a main AC outlet either inside or outside the patient environment. The peripheral device and medically approved isolation transformer combination can be either (a) within the same room as the ultrasound system, or (b) in a non-medically used room.

For additional information and other possible combinations, please refer to the Medical Electrical Equipment Standard EN 60601-1-1 or IEC 60601-1-1, Annex BBB.7, Scenario 3c.

Note: The above information is based on current EN 60601-1-1 and IEC 60601-1-1 standards, dated 2000-12. If your country's regulatory standards for medical equipment do not correspond to EN 60601-1 and IEC 60601-1, as well as, EN 60601-1-1 and IEC 60601-1-1, your local requirements may differ.



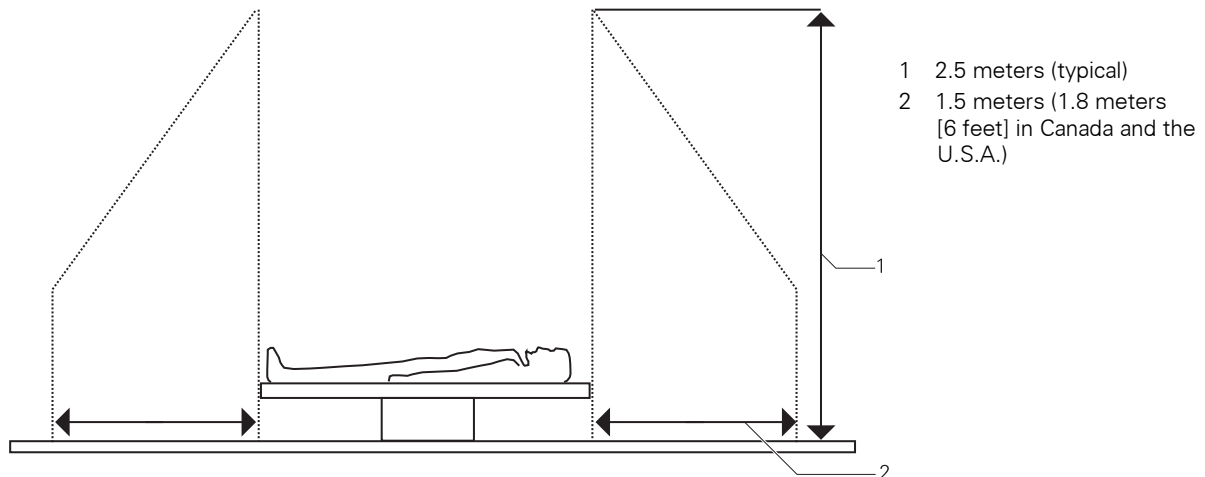
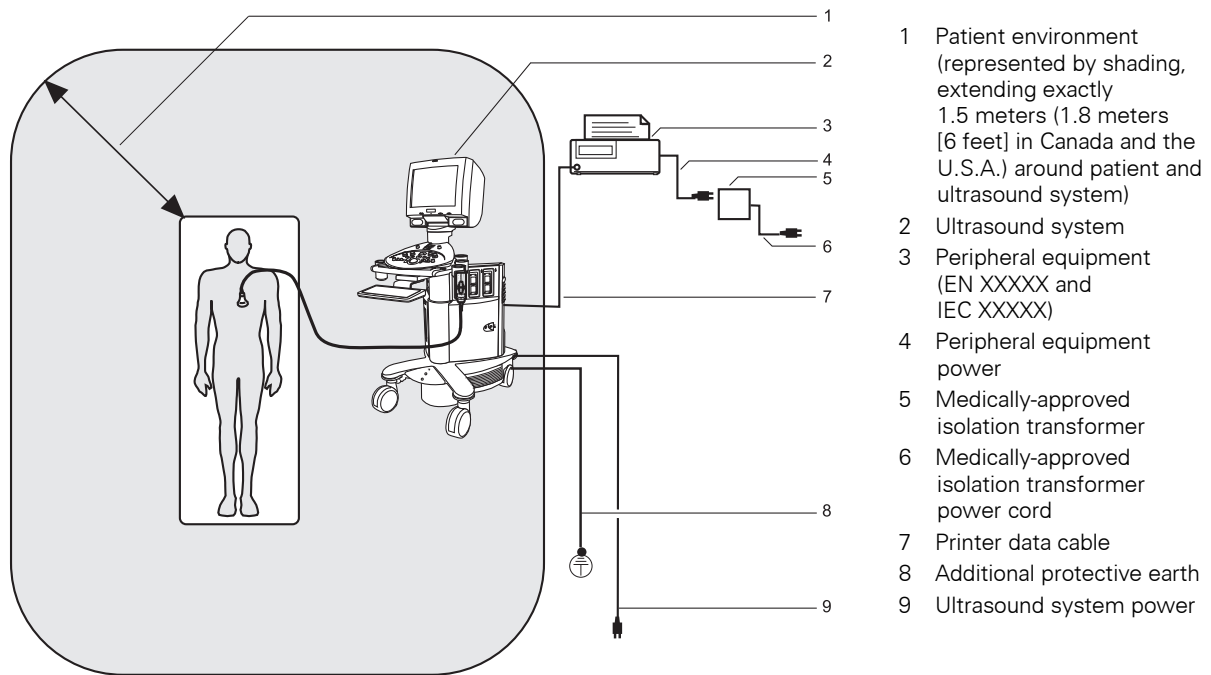
System Reference

Patient Environment	2-11
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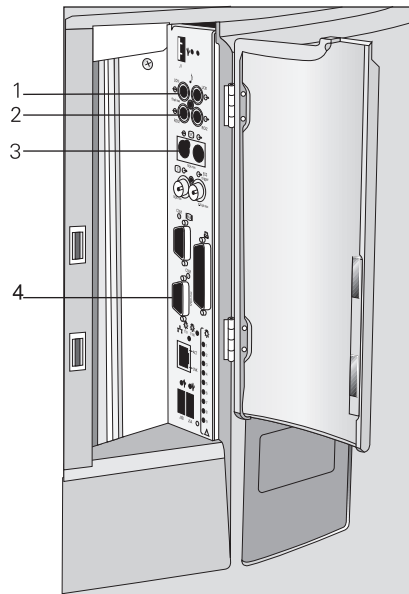
Manufacturers of Medically-Approved Isolation Transformers

Manufacturer	Web Site
Tripp Lite	www.tripplite.com
Toroid Corporation of Maryland	www.toroid.com
Dale Technology Inc.	www.daletech.com

Patient Environment



Installing the Off-Board Video Cassette Recorder (VCR)



I/O panel with VCR connections.

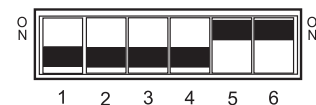
- 1 Left side: Left (Channel 1) audio in from VCR
Right side: Left Audio Out to VCR
- 2 Left side: Right (Channel 2) audio in from VCR
Right side: Right Audio Out to VCR
- 3 Left side: Video In from VCR
Right side: Video Out to VCR
- 4 VCR RS-232 In, COM 1

Installing the Off-Board Sony SVO-9500 MD2/MDP2 Video Cassette Recorder (VCR)

To connect the VCR to the ultrasound system:

⚠ WARNING: Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

1. Power off (⏻) the ultrasound system.
2. Ensure that the VCR is powered off. (The power switch is located on the front of the VCR.)
3. Plug the VCR AC power cord into the back of the VCR and plug the other end into an AC power outlet that is not located on the ultrasound system.
4. Locate the six DIP switches in the upper right corner of the VCR rear panel. Set the four switches on the left to the down position. Set the two switches on the right to the up position.



DIP switches on SVO-9500.

5. There are six connections on the rear of the VCR that must be connected to the six mating connections on the I/O panel of the ultrasound system, using the VCR cable. All connections for the VCR are bundled into one VCR cable, except for the AC power connection. Route the end of the VCR cable that will connect to the ultrasound system down through the cable channel prior to making connections to the I/O panel on the ultrasound system.

Connect the VCR cable as follows:

- Left Audio In from the VCR connects to Left Audio Out on the I/O panel.
 - Right Audio In from the VCR connects to Right Audio Out on the I/O panel.
 - Video In from the VCR connects to Video Out on the I/O panel.
 - Left Audio Out from the VCR connects to Left Audio In on the I/O panel.
 - Right Audio Out from the VCR connects to Right Audio In on the I/O panel.
 - Video Out from the VCR connects to Video In on the I/O panel.
 - RS232 connector from the VCR connects to RS232 connector on the I/O panel.
6. Power on the VCR.
 7. Power on (⏻) the ultrasound system.

The VCR will be recognized by the ultrasound system if the VCR is connected and powered on prior to the ultrasound system being powered on.

Printer maintenance

You will need to perform the following printer maintenance:

- Replace empty printer paper rolls.
- Refill empty ink cassettes.
- Clean the printer according to manufacturer's recommendations.

Follow the printer manufacturer's instructions for your specific printer.

Accessing the ink cassette for color printers

You may need to adjust the ultrasound system to access the printer before removing or replacing the color printer ink cassette.

Note: When two on-board peripheral devices are installed, the Height Adjustment control is locked in the highest position.

To access the ink cassette:

1. Remove any transducer holders on the left side of the control panel of the ultrasound system that are obstructing your access to the printer.
2. Ensure that the control panel of the ultrasound system is in the highest position. To raise the height of the control panel, press the Height Adjustment control.
3. Fully extend the keyboard from under the control panel on the ultrasound system.
4. Follow the printer manufacturer's instructions to unlock the ink cassette.
5. Pull the ink cassette out as far toward the right as possible and angle downward slightly to disengage the cassette.
6. Follow the printer manufacturer's instructions to service the ink cassette.
7. Reinstall the ink cassette into the printer by following the same angled path used to remove it.
8. Readjust the keyboard and the height of the control panel of the ultrasound system to your preferred working position.
9. Reattach any transducer holders removed during this procedure.



Instructions for Use

Transducer	
Holders	Ch 4
System	
Ergonomics	Ch 4

Troubleshooting On-Board Printers

On-board printers are thermal printers (either color or black and white). You send a film job to an on-board printer when you:

- Press a documentation control that is assigned to an on-board printer and configured to print during the examination, and enough images have been printed to complete the layout of the film sheet.
- Press a documentation control that is assigned to an on-board printer and configured to print at the end of the examination, and then end the examination.
- Select a film job in the **Filming** screen, select an on-board printer from the **Camera** tab, and then select the **Expose Film Job** button on the right of the **Filming** screen

If an on-board printer does not print the sent film job, then use the following troubleshooting procedure.

To troubleshoot an on-board printer that is not printing:

1. View the power status LED located on the printer. If the power status LED is not illuminated, the printer is powered off. Power on the printer.
2. If the printer is still not printing and one of the following indicators displays on the printer (indicating that the printer is out of paper or ribbon), then install paper and/or ribbon, or correct the paper jam or ribbon jam condition.
 - EP displays on the LCD (Mitsubishi P91DW)
 - SHEET/PAPER LED is illuminated (Mitsubishi CP770DW, Mitsubishi CP800DW)
3. If the printer is still not printing, reset all on-board printers:
 - a. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen.
The system displays the **Presets** menu.
 - b. Select **Service** on the left of the screen.
 - c. Select the **Printer Reset** button on the right of the screen.
The system deletes each film job currently being processed by an on-board printer.
4. Test printer functionality using one of the following methods:
 - Wait for the next film job in the queue to print.
 - Send image(s) to the printer.



System Reference

RESOURCES:

Assigning Functions to the Print/Store Keys	Ch 1
Configuring Print Preferences	Ch 1
PATIENT DATA: Printing Images from the Filming Screen	Ch 1
Displaying Film Job Information	Ch 1

5. If the printer is still not printing, cycle power to the printer as specified.

To cycle power on this printer...	Do this:
Mitsubishi P91DW Mitsubishi CP770DW	1. Power off the printer. 2. After three seconds, power on the printer.
Mitsubishi CP800DW	1. Power off the printer. 2. After three seconds, press and hold the ONLINE button located on the printer while powering on the printer. 3. When the DATA LED is no longer illuminated (after approximately five seconds), release the ONLINE button. 4. Press the ONLINE button again. The ONLINE LED is now illuminated.

The system retains all film jobs that were sent to the printer before it was powered off.

Note: For the Mitsubishi CP770DW printer, you may need to resend the film jobs.

1 System Presets

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About the System Presets Menu

When the ultrasound system arrives at your site, all control settings are factory-defined. You can use the options and settings available in the Presets menu to set up the ultrasound system with your preferences. System presets define the configuration of the system software whenever you power on the system.



System Reference

IMAGE:
User-defined
Exam types Ch 1

Organization of System Presets

The system displays the **Presets** menu with categories of system presets on the left of the screen and corresponding selections for the active category on the right of the screen. Selections are modified through the use of graphical elements such as on-screen buttons, drop-down menus, and text entry fields.

The system displays additional selections, when available, in dialog boxes. Dialog boxes are accessed using on-screen buttons.

Categories

Use the system presets to modify and customize the ultrasound system in the following categories:

- Basic System
- Basic System 2
- Doppler/M-mode Setup
- Print/Store
- Pictograms and Annotations
- Physio System
- Measurement Labels Display
- System-wide Measurement Tools
- 2D-mode Measurement Tools
- Doppler Measurement Tools
- Custom Measurement Labels
- Measurement Report Settings
- OB Calculations
- Custom Gestational Age Tables
- Application Specific Settings
- Service

A description of the selections for each category of system presets is provided.

Graphical Elements

- **Save:** saves all changes made.
- **Cancel:** cancels all changes made.
- **Restore Factory Settings or Restore Defaults:** deletes user-defined settings and restores factory settings.
- **Add:** adds the entered item.
- **Remove:** deletes the selected item in a drop-down menu.
- **Advanced:** displays advanced settings menu.
- **Text entry:** use the keyboard to enter text into the field.
- **Drop-down menu:** select the menu option you want from the drop-down menu.
- **Radio button:** select one of the buttons. Selecting one button deselects the other.
- **Check box:** select the option by checking the check box.
- **Button:** select the button to display additional settings in a dialog box or window or to perform a function.
- **Slider:** select the slider and then roll the trackball to change the selection.

Accessing the System Presets Menu

You can use the system presets at any time to change the factory (default) settings or modify your own presets. When you exit the menu, the system retains your selections and definitions.

Note: Changes to system presets may not take effect until you cycle power to the system.

To display the Presets menu:

1. Press the **Presets** key located on the keyboard, or select the **Presets** button at the bottom of the image screen.
2. Select a category of system presets on the left of the screen for customization or modification.
3. To customize or modify system presets, use the graphical elements on the right of the screen for the selected category.
4. To exit the **Presets** menu, press the **Presets** key a second time.

Example Procedure: Changing the hospital name

1. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen.
2. Select **Basic System**.
3. Select the **Registration Configuration** button on the upper left of the screen.
The system displays the **Registration Configuration** dialog box.
4. Select the **Entering Data** tab on the upper left of the dialog box.
5. Select **Institution Name** from the **Entry** drop-down menu.
6. If the hospital name is listed at the top of the list, then select **Use first entry as default**.
7. If the hospital name is not listed at the top of the list:
 - a. Use the trackball and **SELECT** key to position the pointer before the name at the top of the list, if any.
 - b. Press the **Enter** key on the keyboard to create a blank line at the top of the list, and then use the arrow keys to position the trackball pointer within the blank line.
 - c. Use the keyboard to enter the hospital name.
 - d. Select **Use first entry as default**.
8. Select **OK** to save the changes and exit the **Registration Configuration** dialog box.
9. To exit the **Presets** menu, press the **Presets** key.

Restoring Factory Settings

You can restore the factory settings at anytime using the **Restore Factory Settings** button or the **Restore Defaults** button located at the bottom of the **Presets** screen. When you restore factory settings, the user-defined settings for the displayed system presets menu are deleted.

Basic System Presets

These selections display when you select the **Basic System** category on the **Presets** menu.

Selection:	Allows you to...
System Settings	
Registration Configuration...	<p>Display the Registration Configuration dialog box to create custom entries for some fields and configure search options.</p> <p>For more information, refer to page 1-9.</p>
Date & Time Settings...	<p>Display the Windows® Date/Time Properties dialog box to set the system date, time, and time zone.</p> <p>Note: The long date format is not used by the ultrasound system.</p>
Regional Settings...	<p>Display the Windows® Regional Options dialog box to designate the system language (General tab), select the measurement system (metric or U.S.) (Numbers tab), select a date and time format (Date tab, Time tab), and configure keyboard mapping (Input Locales tab).</p> <p>Note: When you change and save the setting for the measurement unit and/or the date format, the change is implemented immediately; however, the new measurement unit and/or date format does not display on the Patient Registration form until you cycle power to the system.</p> <p>Note: Changes in the Currency tab do not affect the ultrasound system.</p>
Image Text Editor...	<p>Display the Image Text Configuration dialog box to select image text for display on saved and printed images. The View Name drop-down list includes the selections USImage (ultrasound image) and SCImage (secondary capture image).</p> <p>For more information, refer to page 1-10.</p>
Monitor	
Enable Screen Saver	Enables a Screen Saver after a selected duration of operational inactivity to preserve monitor performance. The active transducer is also stopped to preserve its performance.
Screen Saver Delay	Select the duration of operational inactivity needed to activate the Screen Saver: 0 – 60 minutes.
Dual	
Seamless Dual	Determine the display of the Dual format: On (Seamless Dual) or Off (Dual).

Selection:	Allows you to...
Automatic Disk Management	For more information, refer to page 1-13.
Auto Clean up if	<p>Activate or deactivate automatic deletion of unprotected patient studies that have one or more of the work status conditions indicated by the selected check boxes below. Work status is visible in the patient Browser.</p> <ul style="list-style-type: none"> ▪ Archived: Automatically delete patient studies with this work status ("A"). ▪ Archived & Committed: Automatically delete patient studies with this work status ("AC"). ▪ Archived & Verified: Automatically delete patient studies with this work status ("AV"). ▪ Sent: Automatically delete patient studies with this work status ("S"). ▪ Sent & Committed: Automatically delete patient studies with this work status ("SC"). ▪ Printed: Automatically delete patient studies with this work status ("P"). <p>Note: The work status indicators AC, AV, and SC are displayed in the patient browser at the image data level only.</p>
Audio	
Microphone	Set the microphone: On or Off .
Speaker Volume	Select the volume level: 0 – 10 .
DGC	
DGC Control	Select the image depth setting: Maximum image depth or Current image depth .
DGC Display	Select the DGC display: On , Off , or Fade .

Registration Configuration Dialog Box

These selections display after you select the **Basic System** category on the **Presets** menu and then select **Registration Configuration**.

To preserve selections on the **Registration Configuration** dialog box, you must select the **OK** button after selections are made.



System Reference

PATIENT DATA:
Worklist
query interval Ch 2

Selection	Description
Entering Data	
Entry	Creates entries for the selected field: Referring Physician, Requesting Physician, Admitting Diagnosis, Ward, Institution Name, Performing Physician1, Performing Physician2, Operator1, Operator2 . The maximum allowed characters for each entry is 50.
No default	Disables automatic display of entry for the selected field in the Patient Registration form.
Use first entry as default	Automatically displays the first entry for the selected entry field in the Patient Registration form (for registration of a new patient).
Keep selection from previous (pre-) registration as default	Automatically displays the entry that was last chosen during registration or pre-registration within the selected entry field in the Patient Registration form.
Searching	
Where to Search	Specifies locations from which to search for patients from the Patient Registration form. Note: The Scheduler check box enables system search of the Scheduler database on the hard disk (not the Worklist). The system searches for patients in Scheduler before searching in Local Database .
Stop searching after	Specifies the number of patients to include in one search.
Columns of search list	Specifies the columns to be displayed in the search list (Show check box), designates the order of the displayed columns (Pos. textbox), and configures the width of each displayed column (Width textbox).
HIS/RIS	
Update Worklist in Background	Automatically initiates a HIS/RIS query at the configured interval. Use the Service menu of the system presets to configure the interval.
Show license expiry message	Not applicable.
Get worklist for	Limits search of the Worklist as follows: <ul style="list-style-type: none"> ▪ Local Site limits the search to patients scheduled for the Application Entity Title matching that of the ultrasound system. ▪ Modality of type US limits the search to patients scheduled for the ultrasound ("US") modality.

Selection	Description
Time scheduled	Limits search of the Worklist as follows: <ul style="list-style-type: none"> ▪ When selected, displays the Worklist Time Range dialog box when you update the Worklist, then limits search of the Worklist to patients scheduled for the specified dates and times. ▪ When cleared, limits search of the Worklist to patients scheduled for today.
OK	Saves all changes made and exits the dialog box.
Vendor Default	Restores factory settings.
Cancel	Cancels all changes made and exits the dialog box.
Help	Displays the online help.

Image Text Configuration Dialog Box

These selections display after you select the **Basic System** category on the **Presets** menu and then select **Image Text Editor**.

The image text available for the selected image type is listed on the left of the dialog box. A check box is displayed to the left of each line of image text. A check mark in the check box indicates that the line of image text is to be displayed on printed and stored images of the selected image type.

To preserve selections on this dialog box, you must select the **OK** button after selections are made.

Selection	Description
View Name	Type of image for which to configure image text: <ul style="list-style-type: none"> ▪ Default – (not applicable) ▪ USImage – ultrasound image ▪ SCImage – secondary capture image Note: The system does not use images of the Default type.
All Text	Displays all image text on printed or stored images.
Customized Text	Displays selected image text on printed and stored images.
No Text	Displays no image text on printed and stored images.
OK	Saves all changes made and exits the dialog box.
Apply	Saves all changes made.
Cancel	Cancels all changes made and exits the dialog box.
Help	Displays the online help.

Automatic Deletion of Transferred Patient Studies (Automatic Disk Management)

You can configure the system to automatically manage disk space by deleting transferred patient studies when space falls below the automatic deletion threshold.



Basic System

When automatic disk management is enabled and the amount of used storage space on the local database (**Local Database**) reaches a system-defined threshold, the system automatically deletes the oldest studies that have been transferred to your primary archive device, such as a storage device, CD, or printer. Use the system presets to enable automatic disk management.

Criteria for Deletion

Note: Siemens recommends that you limit automatic deletion to data that has been sent to printers or archive devices only.

To qualify for deletion through automatic disk management, a study must fulfill the following requirements:

- The date on which the study (or most recent series object within the study) was stored to the system is outside the delay threshold. The delay threshold is the number of days prior to the most recent storage date that qualifies for the deletion process.
- All series objects and all images within the study are unprotected (system default).
- The study's work status meets at least one (not necessarily all) of the criteria specified for automatic disk management:

Work Status Indicator (displayed in the patient browser)	Criteria (Automatic Disk Management check box, displayed in the system presets)
A	Archived
AC	Archived & Committed
AV	Archived & Verified
S	Sent
SC	Sent & Committed
P	Printed

Note: When the **Archived** check box is selected, studies qualify for deletion when they have any of the following work status indicators: **A**, **AC**, or **AV**. When the **Sent** check box is selected, studies qualify for deletion when they have any of the following work status indicators: **S** or **SC**. The work status indicators **AC**, **AV**, and **SC** are displayed at the image data level only.

For example, if **Archived** is the only **Automatic Disk Management** check box selected and the delay threshold is two days, then to qualify for deletion, each study must have a storage date (usually corresponding to study date) at least three days ago, must be unprotected, and must have the work status indicator **A** (which indicates complete archival).

Note: The storage date is the date on which the study was first stored to the local database. The storage date usually corresponds to the study date and does not relate to other dates, such as the date on which a study was imported to the local database.

Use the patient browser to view work status.



System Reference

PATIENT DATA:	
Viewing and protecting patient data	Ch 1
Configuring display for work status	Ch 1
Devices Used for Data Transfer	Ch 2
RESOURCES:	
Automatic Transfer of Patient Data	1-26
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Instructions for Use

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Images Printed to an On-Board Printer

Images that are only printed to an on-board printer qualify for deletion regardless of the deletion criteria selected for automatic disk management. This information does not apply to images that have been also transferred or explicitly stored using a documentation control.

To protect such images from deletion through automatic disk management, assign protection status. Use the patient browser to assign protection status.



System Reference

PATIENT DATA:

Viewing	
patient data	Ch 1
Assigning	
protection status	Ch 1

Study Deletion Process

With automatic disk management enabled, the system begins study deletion as a background operation when the amount of used storage space reaches the system's automatic deletion threshold. Your Siemens service representative can change the threshold value.

Storage space is checked every time an examination ends.

The system deletes older studies first, ignoring the most recently stored studies according to the system's delay threshold. Your Siemens service representative can change the threshold value.

The storage date of the most recent series object within the study matches the date of the study ("study date"). Use the patient browser to view the study date.

Note: If no studies exist for a patient after the study deletion process, then the system automatically deletes the empty patient folder.

Notification of Storage Space Availability

Regardless of the automatic disk management settings in system presets, the system displays a message if the amount of used storage space reaches any of the system's notification thresholds (low warning and full warning). Your Siemens service representative can change the threshold values.

The low warning message is displayed briefly on the lower right of the screen. The full warning message is displayed within a message box at the bottom of the screen and continues to display until you dismiss the message box.

Default Values for Automatic Disk Management Thresholds

Your Siemens service representative can change the threshold values used for Automatic Disk Management.

Automatic Disk Management Threshold	Default Value
automatic deletion	75 percent of the storage space
delay	two days
low warning (notification)	85 percent of the storage space
full warning (notification)	95 percent of the storage space

Automatic Disk Management Configuration

Use the system presets to enable automatic disk management.



Basic System

To configure the system for automatic deletion of stored patient studies:

- 1. Select the **Presets** key on the keyboard or select the **Presets** shortcut button at the bottom of the image screen.
- 2. Select **Basic Systems** on the left of the screen.
- 3. Select the **Auto Clean up if** check box at the top of the **Automatic Disk Management** section (upper right of the screen) to enable automatic disk management.

Note: The system does not enable automatic disk management unless the **Auto Clean up if** check box is selected and one or more of the other check boxes in the **Automatic Disk Management** section is selected.

- 4. Select one or more **Automatic Disk Management** check boxes according to your primary archive location, as specified below.

If your primary archive location is a(n)...	Then select the following check box(es)...
Archive device on the network that is configured for the DICOM service "storage commitment"; in addition, a storage device on the network is also configured for the DICOM service "storage commitment"	Archived & Committed Sent & Committed Ensure that all other check boxes are cleared.
Archive device on the network	Archived
CD	Archived & Verified
Printer (DICOM or on-board printer)	Printed
Storage device	Sent

- 5. Select the **Save** button to save your changes.
- 6. Select the **Presets** key on the keyboard or select the **Presets** shortcut button at the bottom of the screen to exit **Presets**.

Basic System 2 Presets

These selections display when you select the **Basic System 2** category on the **Presets** menu.



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IMAGE:
TEQ Technology Ch 2

Selection:	Allows you to...
Cine Measurement Behavior	
Application	Select the application to associate with the CINE measurement behavior.
Erase in CINE	Erases measurements when the CINE wheel is rotated for the selected application.
Freeze Behavior	
Go To Calcs on Freeze	Display the Calcs task card when the FREEZE key is pressed.
Tissue Equalization	
Automatically refresh on unfreeze	Automatically optimize the overall FOV image brightness uniformity when TEQ™ technology (Tissue Equalization) is active and you reactivate real-time imaging (from a frozen image) by pressing the FREEZE key.
Thermal Index Display	
TIS/TIB	Selects the thermal index TIS/TIB (Soft Tissue Thermal Index/Bone Tissue Thermal Index) for use when a neonatal exam type is active.
TIC	Selects the thermal index TIC Cranial Bone Thermal Index for use when a neonatal exam type is active.
Default Exam Settings	
Transducer	Specify a transducer.
Default Exam	Designate a default exam type for the selected transducer. This list includes all exam types, including user-defined exam types, supported by the selected transducer.
Study Configuration	
Study	Select a study type to designate its exam type.
Add	Create a user-defined study type.
Remove	Delete a user-defined study type.
Default Exam	Select an exam type for use with the selected study. This list includes all exam types, including user-defined exam types, on the system. Note: The Transducer list located below the Default Exam selection is meant for information only. This list cannot be edited.

Doppler/M-Mode Setup Presets

These selections display when you select the **Doppler/M-Mode Setup** category on the **Presets** menu.

Selection:	Allows you to...
Common mode	
Cursor Mode	Set the cursor mode for both Doppler and M-mode: On or Off .
Cursor Audio Mode	Set the audio for Doppler: On or Off .
Doppler mode	
Cursor Audio Mode	Select the audio for the Doppler cursor: On or Off .
Velocity/Frequency	Select whether Velocity or Frequency is used during Doppler measurements: Velocity or Frequency .
2D/Doppler Display Format	Select the display format for 2D/Doppler images: 1/2 2D, 1/2 trace 1/3 2D, 1/3 trace 2/3 2D, 1/3 trace Side by side
Default 2D Update Style	Select display of real-time or frozen 2D image during update: Frozen or Live .
Default Doppler Update Style	Select display of real-time or frozen spectrum during update: Frozen or Live .
M-mode	
2D/M-mode Display Format	Select the display format for 2D/M-mode images: 1/2 2D, 1/2 trace 1/3 2D, 1/3 trace 2/3 2D, 1/3 trace Side by side

Print/Store Presets

These selections display when you select the **Print/Store** category on the **Presets** menu.

The **Print/Store** system presets screen lists selections for each **PRINT/STORE** key on the control panel. Each key is represented in the **Print Routing** section of the screen by either a printer or disk graphic.



Print/Store keys on the control panel.

Below the **Print Routing** section are two tabs: **Configure Store** and **Configure Printers**.

- The **Configure Store** tab lists all devices that have been configured for data transfer.
- The **Configure Printers** tab lists all configured printers.

Selection	Description
Print Routing	
BW	Assigns the print function to the designated PRINT/STORE key and sends black and white images to the selected printer when printed with the designated PRINT/STORE key.
Color Doppler	Assigns the print function to the designated PRINT/STORE key and sends Color Doppler or Power mode images to the selected printer when printed with the designated PRINT/STORE key.
Tinted	Assigns the print function to the designated PRINT/STORE key and sends images with tint to the selected printer when printed with the designated PRINT/STORE key. Images with tint are those with a map value in the following range: map 5-11 for 2D-mode or M-mode, or map 4-11 for Doppler.
2D Ref	Assigns the print function to the designated PRINT/STORE key and sends 2D/PW Doppler images with color in the 2D portion to the selected printer when printed with the designated PRINT/STORE key.
Misc	Assigns the print function to the designated PRINT/STORE key and sends miscellaneous images to the selected printer when printed with the designated PRINT/STORE key. Miscellaneous images include secondary capture images, screen captures, external video captures such as VCR, and saved images from the Review task card containing multiple images.
Store	Assigns the store function to the designated PRINT/STORE key and stores images to the Store Servers specified in the Configure Store tab of the Print/Store system presets screen.



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Configuration
procedures for
print/store
function

Ch 4

Selection	Description
Configure Store	
Auto Transfer	<p>Specifies timing of the store operation to the selected Store Server destination. This store operation is in addition to the default store operation to the system's local database. Available selections follow.</p> <ul style="list-style-type: none"> ▪ Disabled – Storage to the selected Store Server destination does not occur. ▪ During Exam – Storage to the selected Store Server destination occurs when you press a PRINT/STORE key that is configured for storage (has been assigned the store function). ▪ End of Exam – Storage to the selected Store Server destination occurs at the end of the examination for all images stored by a PRINT/STORE key configured for storage (that has been assigned the store function). <p>Note: The During Exam selection is not available for the CD drive.</p>
Secondary Capture	<p>Specifies the format in which images are stored to the system's hard disk (Local Database):</p> <ul style="list-style-type: none"> ▪ Selecting the check box enables secondary capture image format. ▪ Clearing the check box enables ultrasound image format.
Graphics in Pixel Data	<p>Enables or disables overlays for printed and stored images. When selected, image text and graphics (such as annotations) are stored as part of the image. When cleared, image text and graphics are stored as an overlay, separate from the image.</p> <p>Note: This selection is automatically selected (and dithered) when Secondary Capture is selected.</p>
Advanced	<p>Configures and activates rules for transferring and archiving using the Transfer Configuration dialog box.</p> <p>For more information, refer to page 1-19.</p>
Configure Printers	
Auto Transfer	<p>Enables or disables automatic printing. If enabling automatic printing, select the time at which the print should occur: During Exam or End of Exam. To disable automatic printing, select Disabled.</p> <p>Note: The During Exam selection is not available for the CD drive.</p> <p>Automatic printing does not occur until the selected layout (number of images per sheet of film or paper) is complete or until the examination ends, whichever happens first.</p> <p>When automatic printing is disabled, the system places the printed image(s) in the Filming screen. You can then send the image(s) to the designated printer at your chosen time.</p>
Media Size	Size of film or paper.
Layout	Number of images per sheet of film or paper .

Selection	Description
Orientation	Specify directional placement of image(s) on the paper or film: Landscape or Portrait .
Optimize large sheet	When enabled, reduces the amount of data sent to the printer, which reduces the amount of time needed for printing. You must cycle power to the system for a changed setting to go into effect. Note: This selection affects monochrome DICOM printers (configured as "kodak8610" class) only, for the following film sheet sizes only: 11 X 14, 11 X 17, 14 X 17.
Advanced	Displays the Filming Layout dialog box. For more information, refer to page 1-23.

Transfer Configuration Dialog Box

Note: Siemens recommends that settings not be changed in the **Transfer Configuration** dialog box.

These selections display after you select the **Print/Store** category on the **Presets** menu and then select **Advanced** on the **Configure Store** tab.

The **Transfer Configuration** dialog box contains the following tabs: **Auto Transfer**, **Exporting**, and **Sending**.

- The **Auto Transfer** tab includes settings for automatic transfer of patient data with specified status. You can select archive, offline, or storage devices.
- The **Exporting** tab lists offline and archive devices.
- The **Sending** tab lists storage devices.

To preserve selections on the **Transfer Configuration** dialog box, you must select the **Apply** button after selections are made.



System Reference

PATIENT DATA:
Devices Used for
Data Transfer Ch 2

Selection	Description
Auto Transfer	For more information, refer to page 1-26.
New	Defines a new transfer rule. Note: You can define up to 10 transfer rules.
Delete	Deletes the selected transfer rule.
Activate transfer rule	Activates the selected transfer rule.
Marked images only	Limits the selected transfer rule to marked images. When used in combination with the Printed images only check box, limits the selected transfer rule to images that are both marked and printed.
Printed images only	Limits the selected transfer rule to printed images. When used in combination with the Marked images only check box, limits the selected transfer rule to images that are both marked and printed.
(Workstate)	Specifies a state, such as Completed or Read , for the selected transfer rule. The "*" entry sets the selected transfer rule to disregard state (Workstate).
(Processing Status)	Specifies a work status, such as Archived or Received , for the selected transfer rule. The "*" entry sets the selected transfer rule to disregard work status (Processing Status).
(Objects)	Specifies a type of object for the selected transfer rule. Note: Images is the only valid selection.
(Destination)	Specifies a destination for the selected transfer rule. Note: Disregard the selection "ward" unless the system configuration includes a "ward" device and images to be transferred contain matching "ward" information.

Selection	Description								
Exporting									
Archive only	<p>Displays a message notifying you of unmet precondition(s) when you archive patient data to a listed device and that data has not achieved the selected precondition(s).</p> <p>Preconditions are: Unspecific, Completed, Verified, Read, and/or Printed.</p> <p>Note: Siemens recommends that this setting not be changed from Unspecific (the default).</p> <p>Note: Automatic archiving configured as a transfer rule cannot occur unless the configured preconditions have been achieved.</p>								
Compression Type	<p>Specifies a compression type for the selected destination:</p> <ul style="list-style-type: none"> ▪ None – Exported images are not compressed. <p>Note: Siemens recommends that this setting not be changed from None (the default).</p> <ul style="list-style-type: none"> ▪ Lossless JPEG – Exported images are compressed without loss of information. (Images can be restored to their original image quality.) ▪ Lossy JPEG – Exported images are compressed with loss of information. 								
Quality Factor	<p>Compresses images by the entered value. This selection is available when Lossy JPEG is selected for Compression Type in the Transfer Configuration dialog box.</p> <p>The range of settings is from 1 to 99, in increments of 1. Lower settings result in higher compression. Higher compression results in more loss of image quality.</p> <p>Each setting represents a compression ratio, which is the number of lossy-compressed images that can be transferred using the amount of data required for transfer of one uncompressed image. For example, the setting of 98 represents a compression ratio of approximately 7:1, which allows the system to transfer seven lossy-compressed images using the amount of data required for transfer of one uncompressed image.</p> <p>Settings Used for Low, Medium, and High Compression Ratios</p> <table> <tr> <th>Quality Factor</th><th>Approximate Compression Ratio*</th></tr> <tr> <td>98</td><td>7:1 (Low)</td></tr> <tr> <td>92</td><td>10:1 (Medium)</td></tr> <tr> <td>70</td><td>20:1 (High)</td></tr> </table> <p>* Compression ratios listed are approximate. Actual compression ratios vary depending on image type and content.</p>	Quality Factor	Approximate Compression Ratio*	98	7:1 (Low)	92	10:1 (Medium)	70	20:1 (High)
Quality Factor	Approximate Compression Ratio*								
98	7:1 (Low)								
92	10:1 (Medium)								
70	20:1 (High)								

Selection	Description								
Keep all objects for one patient on one medium	Disallows partial transfer (transfer of part of the data for a specific patient). When this selection is enabled, the system checks for sufficient space on the selected destination (such as the CD) before transferring the data for a specific patient. If space is insufficient, then the system does not transfer any data for the patient.								
Maximize media usage	Allows partial transfer (transfer of part of the data for a specific patient). When this selection is enabled, the system does not check for sufficient space on the selected destination (such as the CD) for all of a specific patient's data being transferred. The system transfers the patient's data until no more space remains on the selected destination, which may result in partial transfer.								
Sending	Note: The Sending tab is available only when network devices are connected and configured.								
Archive only	Displays a message notifying you of unmet precondition(s) when you archive patient data to a listed device and that data has not achieved the selected precondition(s). Preconditions are: Unspecific, Completed, Verified, Read, and/or Printed . Note: Siemens recommends that this setting not be changed from Unspecific (the default). Note: Automatic archiving configured as a transfer rule cannot occur unless the configured preconditions have been achieved.								
Compression Type	Specifies a compression type for the selected destination: <ul style="list-style-type: none"> ▪ None – Sent images are not compressed. Note: Siemens recommends that this setting not be changed from None (the default). <ul style="list-style-type: none"> ▪ Lossless JPEG – Sent images are compressed without loss of information. (Images can be restored to their original image quality.) ▪ Lossy JPEG – Sent images are compressed with loss of information. 								
Quality Factor	Compresses images by the entered value. This selection is available when Lossy JPEG is selected for Compression Type in the Transfer Configuration dialog box. The range of settings is from 1 to 99 , in increments of 1. Lower settings result in higher compression. Higher compression results in more loss of image quality. Each setting represents a compression ratio, which is the number of lossy-compressed images that can be transferred using the amount of data required for transfer of one uncompressed image. For example, the setting of 98 represents a compression ratio of approximately 7:1, which allows the system to transfer seven lossy-compressed images using the amount of data required for transfer of one uncompressed image. Settings Used for Low, Medium, and High Compression Ratios <table> <tr> <th>Quality Factor</th><th>Approximate Compression Ratio*</th></tr> <tr> <td>98</td><td>7:1 (Low)</td></tr> <tr> <td>92</td><td>10:1 (Medium)</td></tr> <tr> <td>70</td><td>20:1 (High)</td></tr> </table> <p>* Compression ratios listed are approximate. Actual compression ratios vary depending on image type and content.</p>	Quality Factor	Approximate Compression Ratio*	98	7:1 (Low)	92	10:1 (Medium)	70	20:1 (High)
Quality Factor	Approximate Compression Ratio*								
98	7:1 (Low)								
92	10:1 (Medium)								
70	20:1 (High)								

Selection	Description
Retry (times)	When data transfer is unsuccessful, retries data transfer the selected number of times.
Retry (minutes interval)	Uses the selected number of minutes as an interval between retries.
OK	Saves all changes made and exits the dialog box.
Cancel	Cancels all changes made and exits the dialog box.
Default Settings	Displays factory settings. Select OK to restore the displayed factory settings.
Help	Displays the online help.

Filming Layout Dialog Box

These selections display after you select the **Print/Store** category on the **Presets** menu and then select the **Advanced** button on the **Configure Printers** tab.

The **Filming Layout** dialog box contains the following tabs: **Film Task** and **Series**. The **Film Task** tab includes print settings for pages within each film job. The **Series** tab includes print settings for images within each page.

To preserve selections on the **Filming Layout** dialog box, you must select the **Apply** button after selections are made.

Selection	Description
Layout Name	Drop-down menu containing names of existing layouts. Note: Do not change this selection from the factory default.
Film Task	
New film job by patient	<ul style="list-style-type: none"> When enabled, creates a new film job for each patient (per printer destination). When disabled, includes images for multiple patients in each film job (per printer destination) and causes the system to automatically print full film sheets (pages). For example, if you copy five images to the Filming screen for a selected printer destination with a 4:1 layout (four images per page), then the system automatically prints the first page, leaving one image in the film job.
New film sheet by	Begins a new film sheet (page) for each selected data level (Study or Series) in the film job.
New row of images by	Begins a new row (line) on the film sheet (page) for each selected data level (Patient , Study , or Series) in the film job.
Number of copies	Prints the selected number of copies.
Expose every # document	Note: This selection has no effect.
Film size	Note: This selection has no effect.
Segment lines	Encloses each image with a white border on the printed film or paper.
Series	
Layout divisions	Note: This selection has no effect.
Reference image	Reserved for future use.
Copy series (for Double Window)	When enabled, the system imports two sets of images (instead of one) for each series object that you copy to the Filming screen. The second set of images is arranged according to the selection: Interleaved (each copy inserted after the matching original) or Appended (all copies placed at the end of the film job).
Orientation	<p>Defines the position of the image(s) on the page. Available selections: portrait or landscape. Some printer destinations require portrait orientation.</p> <p>Note: The system uses this setting only when you change film job properties (such as layout) for images that have been copied to the Filming screen. Otherwise, the system uses the setting defined in system presets for the selected printer destination.</p>

Selection	Description
Image	Defines sequential arrangement of copied images on the film sheet (page): horizontal (left to right) or vertical (top to bottom). For example, you copy two images to the Filming screen for a selected printer destination with a 4:1 layout (four images per page). The system always places the first image at the upper left of the page, but the placement of the second image (and succeeding images) depends on this setting. The system places the second image at the upper right when horizontal is selected; at the lower left when vertical is selected.
Aspect Ratio	Defines the image size as related to the segment containing the image. Available selections: Keep visible part (maximum size without being cropped), Original Image (original size), or Clip document (enlarged to fill segment; overlapping edges are cropped). Note: Do not change this selection from the factory default Keep visible part (the only valid setting). Changing this selection from the factory default may cause errors during printing.
OK	Saves all changes made and exits the dialog box.
Apply	Saves all changes made.
Default Settings	Displays factory settings. Select OK or Apply to restore the displayed factory settings.
Cancel	Cancels all changes made and exits the dialog box.
Help	Displays the online help.

Configuring the Filming Screen Settings

Use the system presets to configure the settings used for film jobs in the **Filming** screen.



Print/Store

To configure the settings used in the **Filming** screen:

1. Press the **Presets** key located on the keyboard or select the **Presets** button at the bottom of the image screen.
The system displays the **Presets** screen.
2. Select **Print/Store** on the left of the screen.
3. Select the **Configure Printers** tab and then select the **Advanced** button on the lower right.

The system displays the **Filming Layout** dialog box.

4. Change settings as required in the **Film Task** tab and the **Series** tab.
5. Select the **OK** button on the lower left of the dialog box.
The system saves changes and exits the **Filming Layout** dialog box.
6. To exit the system presets, press the **Presets** key.



System Reference

RESOURCES:
Filming Layout
dialog box

Ch 1

Configuring Transfer Preconditions and Automatic Transfer

You can specify preconditions for data transfer and configure the system to automatically transfer patient data that has the designated status.

Preconditions for Archiving

Use the system presets to configure the system to check for specified preconditions before archiving data.

Preconditions affect archiving in the following ways:

- Manual archiving: When you manually archive data that has not achieved the configured precondition(s), the system displays a message. You can continue the archiving if required.
- Automatic archiving during or at end of examination: When the system archives data and that data has not achieved the configured precondition(s), the system displays a message. You can continue the archiving if required.
- Automatic archiving by transfer rule: Automatic archiving configured as a transfer rule cannot occur unless the configured preconditions have been achieved.

To access the Transfer Configuration dialog box:

1. Press the **Presets** key on the keyboard or select the **Presets** shortcut button at the bottom of the screen.
The system displays the **Presets** window.
2. Select **Print/Store** on the left of the screen and then select the **Configure Store** tab in the middle of the screen.
3. Select the **Advanced** button on the lower right of the **Configure Store** tab.
The system displays the **Transfer Configuration** dialog box.
4. To close the **Transfer Configuration** dialog box, select the **Cancel** button on the lower left of the dialog box.
5. To exit the system presets, press the **Presets** key on the keyboard.

To configure preconditions for archiving to offline devices:

1. Access the **Transfer Configuration** dialog box and select the **Exporting** tab.
2. Select the check box under **Archive only** for each precondition requiring a system check before archiving to the devices listed in the **Exporting** tab.
3. Select the **OK** button on the lower left of the dialog box to save changes.



Print/Store



System Reference

PATIENT DATA:	
Archiving patient data manually	Ch 1
RESOURCES:	
Automatic Deletion of Transferred Patient Studies (Automatic Disk Management)	1-11

To configure preconditions for archiving to network devices:

1. Access the **Transfer Configuration** dialog box and select the **Sending** tab.
2. Select the check box under **Archive only** for each precondition requiring a system check before archiving to the devices listed in the **Sending** tab.
3. Select the **OK** button on the lower left of the dialog box to save changes.

Automatic Transfer of Patient Data

Note: Siemens recommends that you choose one method of data transfer for each device: either automatic data transfer (transfer rules for specifying work state and processing status) or automatic storage during or after the examination.

When transfer rule(s) are defined and activated, the system automatically transfers images from the local database (**Local Database**) that have achieved the designated work state, processing status, and preconditions for the relevant transfer operation. Use the **Transfer Configuration** dialog box accessed from the system presets to define and activate transfer rules.

In each transfer rule, you can specify the destination (such as the inserted CD) and the work state and processing status required for data transfer. You can also limit the automatic transfer operation to images that have been printed and/or marked.

Note: The transfer operation (archive, send, or export) used by the system for the transfer rule depends on the configuration of the selected destination. For example, if you select CD as the destination for the transfer rule and the CD is configured as an "archive device", then the system uses the archive operation to transfer data to the CD. If the CD is not configured as an "archive device", then the system uses the export operation to transfer data to the CD.

To access the Transfer Configuration dialog box:

1. Press the **Presets** key on the keyboard or select the **Presets** shortcut button at the bottom of the screen.
The system displays the **Presets** window.
2. Select **Print/Store** on the left of the screen and then select the **Configure Store** tab in the middle of the screen.
3. Select the **Advanced** button on the lower right of the **Configure Store** tab.
The system displays the **Transfer Configuration** dialog box.
4. To close the **Transfer Configuration** dialog box, select the **Cancel** button on the lower left of the dialog box.
5. To exit the system presets, press the **Presets** key on the keyboard.



Print/Store

**System Reference****RESOURCES:**

Preconditions for Data Transfer	1-25
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To define and activate a transfer rule:

Note: You can define up to ten transfer rules.

1. Access the **Transfer Configuration** dialog box and select the **Auto Transfer** tab.
2. Select the **New** button on the upper right of the dialog box.
The system highlights the top (empty) row of the table. The check boxes and the four drop-down lists at the bottom of the dialog box become available for selection.
3. Select an entry from each drop-down list:
 - Workstate (first drop-down list from the left)
 - Processing State (second drop-down list from the left)
 - Objects or a level of patient data (third drop-down list from the left)
Note: You can change the workstatus for all levels of patient data except for images.
 - Destination (fourth drop-down list from the left)
4. To limit the automatic transfer operation to images that have been printed, select the **Printed images only** check box.
5. To limit the automatic transfer operation to images that have been marked, select the **Marked images only** check box.
6. To view and/or change the archive preconditions for offline devices, select the **Exporting** tab.
The system lists the configured archive preconditions on the right of the **Exporting** tab, under **Archive only**. These archive preconditions apply to the devices listed in the **Exporting** tab that are configured as "archive devices".
7. To view and/or change the archive preconditions for network devices, select the **Sending** tab.
The system lists the configured archive preconditions on the right of the **Sending** tab, under **Archive only**. These archive preconditions apply to the devices listed in the **Sending** tab that are configured as "archive devices".
8. To activate the transfer rule, select the transfer rule from the table and then select the **Activate transfer rule** check box on the lower left of the dialog box.
9. Select the **OK** button on the lower left of the dialog box to save changes.

To de-activate a transfer rule:

1. Select the required transfer rule from the table and then clear the **Activate transfer rule** check box on the lower left of the dialog box.
2. Select the **OK** button on the lower left of the dialog box to save changes.

To edit a transfer rule:

1. Select the required transfer rule from the table and change selections as required.
2. Select the **OK** button on the lower left of the dialog box to save changes.

To delete a transfer rule:

1. Select the required transfer rule from the table and then select the **Delete** button on the upper right of the dialog box.
2. Select the **OK** button on the lower left of the dialog box to save changes.

Pictograms & Annotations Presets

These selections display when you select the **Pictograms & Annotations** category on the **Presets** menu.

Note: The maximum number of characters (including spaces) that are allowed in an annotation is 52.



System Reference

CALCS:
Pictograms
and Annotations Ch 2

Selection	Description
Annotations	
Application	Modify the annotations for the selected application.
Text A	Text box for entry of customized annotation(s) for display when the Text A key is pressed.
Text B	Text box for entry of customized annotation(s) for display when the Text B key is pressed.
Text C	Text box for entry of customized annotation(s) for display when the Text C key is pressed.
Text D	Text box for entry of customized annotation(s) for display when the Text D key is pressed.
(term)	Text box for entry of customized annotation(s) for automatic display when the keys representing the first few letters are pressed. For example, the system automatically displays the annotation "LOBE" when you press the "L" key (assuming that "LOBE" is the first annotation in the list that begins with "L").
Pictograms	
Pictogram Location	Displays the pictogram at the selected screen location: Upper Right or Lower Right .

Physio System Presets

These selections display when you select the **Physio System** category on the **Presets** menu.

Selection:	Allows you to...
Sweep Speed	Select the sweep speed for the Physio trace: 1, 2, 4, 6 or 8 .

Measurement Labels Display

These selections display when you select the **Meas. Labels Display** category on the **Presets** menu.

Selection:	Allows you to...
Application	Modify the display of measurement labels for the selected application.
Imaging Mode	Select the imaging mode for the measurement label.
Measurement Label	Select the measurement labels you want to display for the selected application and imaging mode. To disable display of a measurement label, clear the check box.

System-wide Measurement Tools Presets

These selections display when you select the **System-wide Meas. Tools** category on the **Presets** menu.

Selection:	Allows you to...
Number of Heart Cycles for Heart Rate	Select the number of heart cycles to be used when calculating the heart rate: 1 – 5 .

2D Measurement Tools

These selections display when you select the **2D Meas. Tools** category on the **Presets** menu.

Selection:	Allows you to...
Application	Modify the default 2D-mode measurement tools for the selected application.
Select the Measurement Tool to be used for OB Circumference measurements*	Select the default 2D-mode measurement tool to be used for OB circumference measurements: Ellipse or Trace .
Select the Tool to be used for volume measurements	Select the default 2D-mode measurement tool to be used for volume measurements: 3 distances , 1 distance , or Ellipse & 1 distance . This setting applies to the selected application.
Select the Tool to be used for Stenosis Measurements	Select the default 2D-mode measurement tool to be used for stenosis measurements: By distance or By area . This setting applies to the selected application.

**OB application only.*

Doppler Measurement Tools

These selections display when you select the **Doppler Meas. Tools** category on the **Presets** menu.

Selection:	Allows you to...
Application	Modify the Doppler measurement tools for the selected application.
Default tool	Select the default Doppler measurement tool for the selected application.
Heart cycle fields to display	Select the heart cycle fields to display during Doppler imaging: PS , ED , PI , RI , S/D , or TAV . The system uses this setting for the Heart Cycle tool, the Trace tool, and the Auto Statistics tool. This setting applies to the selected application.
Resistive Index fields to display	Select the heart cycle fields to display during Doppler imaging: PS , ED , RI , or S/D . The system uses this setting for the Resistive Index – Systolic/Diastolic tool. This setting applies to the selected application.
Volume Flow measurement	Select the default volume flow measurement for Volume (2D Trace , Distance , Ellipse) and Flow (D-trace , Heart Cycle). This setting applies to the selected application.
Doppler Ratio Measurements to Use	Select the default Doppler ratio measurement: Maximum Magnitude Measurement or Most Recent Measurement . This setting applies to the selected application. Note: This selection is available for the following applications only: CV , Fetal Echo , OB , Penile , TCD .

Custom Measurement Labels

These selections display when you select the **Custom Meas. Tools** category on the **Presets** menu.

Use the Custom Measurement Labels menu to create or delete customized measurement labels.

To create a custom measurement label:

1. Access the system presets menu and select **Custom Meas. Label**.
2. Select the application from the drop-down menu in the **Create Custom Label** section.
3. Enter a name for the customized label with a maximum of 10 characters.
Note: Acceptable characters include digits, letters, and the underscore ("_").
4. For an OB measurement label, select **Fetal** or **Maternal**.
5. Select an imaging mode from the drop-down menu to associate with the custom label.
6. Select a measurement tool from the drop-down menu to associate with the custom label.
7. Select a report group for the custom label in the patient report.
8. Select **Save** to Create New Label.

The system displays message(s) indicating that it is creating the label and updating the measurement menus.

To delete a custom measurement label:

1. Access the system presets menu and select **Custom Meas. Labels**.
2. Select the application from the drop-down menu in the **Delete Custom Label** section.
3. Select the name of the custom label you want to delete from the drop-down menu.
4. Select the **Delete Label** button.

The customized label is deleted by the system.

5. Select **Save** to save changes.

The system displays message(s) indicating that it is deleting the label and updating the measurement menus.

Measurement Report Settings

These selections display when you select the **Meas. Report Settings** category on the **Presets** menu.

Selection:	Allows you to...
Application	Modify the patient report for the selected application.
Measured value display method	Select the method to be used for measured value display: Mean of measurements or Most recent measurement . This setting applies to the selected application.
Display OB Ratios in OB Reports*	Select the OB ratios to be displayed in OB patient reports: CI, FL/AC, FL/BPD, FL/HC, HC/AC, LVW/FVV, or TDC/AC .

**OB application only.*

OB Calculations

These selections display when you select the **OB Calculations** category on the **Presets** menu.

Selection:	Allows you to...
Gestational Age	For each measurement parameter, select the reference you want to use to estimate gestational age.
Growth Analysis	For each measurement parameter, select the reference you want to use to analyze fetal growth.
Composite Gestation Age	Select the reference you want to use to estimate Composite Gestational Age.
Estimated Fetal Weight	Select the reference you want to use to estimate fetal weight.

Custom Gestational Age Tables

Custom Gestational Age Tables allows you to:

- Create a new simple gestational table
- Edit a user-defined table
- Delete a user-defined table

To create a simple gestational table:

1. Access system presets and select **Custom Gest. Age Tables**.
2. Select the option **Create Custom Simple Gestational Age Table** in the **Action Selections** section.
3. From the **Select Measurement for Simple Gestational Age Table** drop-down list, select the measurement on which you want to base the table.
4. Select the measurement unit from the **Measurement Units** drop-down list – either **cm** or **mm**.
5. Use the keyboard to enter a name for the new table in the **Table Author Name** textbox.

Note: A maximum of 10 characters are allowed. Acceptable characters include digits, letters, and the underscore ("_").

6. Select the **Next** button.

The screen displays a template for a new Simple Gestational Age Table. "XXX" is the selected measurement.

Row	XXX	Age weeks	Age days	2SD days
1				
2				
3				
4				
5				

7. Use the keyboard to enter the table values for the system to use for the Simple Gestational Age Table.

The system provides buttons that allow you to insert or delete rows, and clear the table.

8. Select the **Validate Table** button. Note the results in the displayed message box, and then select the **OK** button in the message box.

The system checks for missing or incorrect data (empty **2SD days** are allowed), empty rows in the middle of the table, and values in the parameter and/or the age columns that are less than values in the earlier row. The system then displays a message box indicating the validity of the table.

9. If the table is not valid, correct the errors and select the **Validate Table** button again.
10. Select the **Save** button.

To edit a Simple Gestational Age Table:

1. Access system presets and select **Custom Gest. Age Tables**.
2. Select **Edit Table** in the **Action Selections** section.
3. Select the user-defined simple gestational age table reference from the **Select Table to Edit** drop-down list.
4. Use the keyboard to enter the values for the system to use for the calculation.
5. Select the **Validate Table** button.
The system checks for missing or incorrect data (empty **2SD days** are allowed), empty rows in the middle of the table, and values in the parameter and/or the age columns that are less than values in the earlier row. The system then displays a message box indicating the validity of the table.
6. If the table is not valid, correct the errors and select the **Validate Table** button again.
7. Select the **OK** button when the **Valid Table** message displays.
8. Select the **Save** button.

To delete a Simple Gestational Age Table:

1. Access system presets and select **Custom Gest. Age Tables**.
2. Select **Delete Table** in the **Action Selections** section.
3. Select the user-defined simple gestational age table reference that you want to delete from the **Select Table to Delete** drop-down list.
4. Select the **Save** button.

Application Specific Settings

These selections display when you select the **App Specific Settings** category on the **Presets** menu.

Selection	Description
Prostate Specific Gravity	Selects a specific gravity for calculation of the prostate weight: 1.0 or 1.05 .
Display Sonometer on Image	Enables or disables display of the sonometer (graph) during measurement of the pediatric hip. The sonometer is always included in the Patient Report.

Service

The service section of the system presets provides local and remote access for authorized Siemens service representatives to troubleshoot and maintain the ultrasound system.

Customers have limited access to the service section of the system presets.

For additional information on user-accessible service presets, refer to the "Reference Guide ■ User-Accessible Service Presets" manual.

Selection	Description
System Information	
Event Log...	Displays the Event Log window.
Shut Down System...	Powers down the system.
Service Options	
Install Software...	Begins installation of the software stored on the installation disk that is inserted into the CD drive.
Service Image...	Displays the Service Image View window.
Local Service...	Displays the Authentication screen for log-on access to service options, such as (for service access level 1) DICOM configuration, backup/restore of ultrasound system files, hardware tests and utilities, and service diagnostic support. To log on with service access level 1, ensure that both Please enter password fields are blank, then select the OK button to the right of the Please enter password fields.
Configure Local Printer...	Displays the Windows Printers window for configuration of on-board printers.
Restore Printer Factory Defaults	Restores the factory defaults for paper size, paper orientation, gamma curve, and other settings displayed in the Windows Printing Preferences dialog box.
Printer Reset	Resets all on-board printers and deletes the oldest uncompleted print request sent to each on-board printer before the printer reset.
Network Speed...	Displays the Network Speed... window.
Remote Access Options	
Remote Service...	Displays the Remote Service Access Control window.
Access Timeout	Sets the number of minutes (0 to 32768) allowed for "Full Access" or Limited Access" when no remote session is running. After this number of minutes has passed, the system restores "No Access".
Session Timeout	Sets the number of minutes (0 to 32768) allowed for an inactive remote access session. After this number of minutes has passed, the system terminates the session.
Video	
Type	Specifies the type of video system: NTSC or PAL .
Output Format	Specifies the format of video output: RGB or YUV .

Backing Up and Restoring the System Settings

Each user of the system can determine settings for imaging preferences and default settings, then store them on a disk. Those user-defined settings can then be loaded along with new system software. The disk also serves as a backup.

Follow these procedures to back up, restore, or copy your system settings. You can restore original system settings to an ultrasound system or copy system settings to another ultrasound system.

System settings available for backing up, restoring, or copying are separated into two *packages*:

- The **UltrasoundSpecific** package includes user-defined exam types and all system preset settings except **Local Service** settings.
- The **SW-Settings02** package includes **Local Service** settings (DICOM network settings, TCP/IP network settings, and other settings).

During the restore/copy process, the system lists the file name for each backed up package that is stored on the CD. The file name indicates the back-up date and time.

Note: To back up patient data stored on the ultrasound system's hard disk (the local database), use the archiving feature in the patient browser.



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Archiving	
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Backing Up System Settings

You can back up the following system settings to a compact disk (CD):

- User-defined exam types and all system preset settings except **Local Service** settings (**UltrasoundSpecific** package), and/or
- **Local Service** settings (DICOM network settings, TCP/IP network settings, and other settings) (**SW-Settings02** package).

To back up system settings:

Note: This procedure requires a compact disk (CD) that is blank or that has been used previously for backing up system settings. Previously backed-up settings are retained.

1. Press the **Presets** key located on the keyboard or select the **Presets** shortcut button at the bottom of the screen.
2. Select **Service** on the left of the **Presets** screen and then select **Local Service**.
3. Delete any passwords in the **Please enter password** fields on the **Authentication** screen and then select **OK**.
4. Select the **Backup & Restore** button on the **Home** menu screen.
5. Select **Backup** from the **Command** drop-down menu.
6. Insert a CD into the compact disk drive.
The system displays **Ready** on the lower left of the screen.
7. Select **[-R-] CD-R** from the **Drives** drop-down menu.
8. For each collection of system settings requiring a back-up copy (**UltrasoundSpecific** package and/or **SW-Settings02** package):
 - a. Ensure that the CD disk drive door is closed.
 - b. Select one of the following from the **Packages** drop-down menu:
 - **UltrasoundSpecific** includes user-defined exam types and all system preset settings except **Local Service** settings.
 - **SW-Settings02** includes **Local Service** settings (DICOM network settings, TCP/IP network settings, and other settings).
 - c. Select **Go** at the bottom of the screen to start the back-up process.

During the backup/restore process, the system indicates progress by listing the settings currently being backed up (such as **Group: UserSettings\SystemPresets\Service**) on the **Backup & Restore** screen. The system also displays **BackupRestore Running** on the lower left of the screen.

When the process is complete, the system displays **Ready** on the lower left of the screen.

- d. Using the scroll bar on the right of the screen, view the listed settings. If any listed settings display in red (instead of black), select **Go** again. Red text indicates that the back-up process did not complete successfully.

Note: You can view more information about red text using the scroll bar at the bottom of the screen.
 - e. If the back-up process still does not complete successfully, contact your Siemens service representative.
9. Remove the CD from the compact disk drive and label it with information identifying the source system and its software version.

Restoring or Copying System Settings

You can restore system settings or copy settings to another system. This procedure lists the selections required to restore/copy the following settings (identified by letter):

- A. All system settings to the same system*
- B. All system settings (except machine-specific data) to another system*
- C. User-defined exam types
- D. System presets and user-defined exam types
- E. Configuration settings for DICOM devices*

* Requires restoring/copying groups from both packages (**UltrasoundSpecific** and **SW-Settings02**).

Refer to the letter identifications of the required settings in the following procedure.

Note: The system does not display copied/restored configuration settings for DICOM devices in the **Print/Store** system presets unless the devices are connected.

To restore or copy system settings:

1. Display the settings that are backed up on the CD:
 - a. Press the **Presets** key located on the keyboard or select the **Presets** shortcut button at the bottom of the screen.
 - b. Select **Service** on the left of the **Presets** screen and then select **Local Service**.
 - c. Delete any passwords in the **Please enter password** fields on the **Authentication** screen and then select **OK**.
 - d. Select the **Backup & Restore** button on the **Home** menu screen.
 - e. Insert the CD containing the backed-up system settings.
 - f. Select **Restore** from the drop-down menu.
 - g. Select **[-R-] CD-R** from the **Drives** drop-down menu.

2. Select the **UltrasoundSpecific** package from the **Archive** drop-down menu and then select the required item(s) from the **Group** drop-down menu.

Note: You can select multiple items using the **Ctrl** and/or **Shift** keys on the keyboard.

To restore/copy...	Select these UltrasoundSpecific group item(s):	Are Local Service settings required?
A. All system settings to the same system	(all)	Yes
B. All system settings (except machine-specific data) to another system	(all)	Yes
C. User-defined exam types	UserSettings\ImagingPresets	No
D. System presets and user-defined exam types	(all)	No
E. Configuration settings for DICOM devices—if devices are configured for use with the PRINT/STORE keys (Print/Store system presets)	UserSettings\SystemPresets \PrintStorePresets	Yes

3. Select **Go** at the bottom of the screen to start the restore process.




During the backup/restore process, the system indicates progress by listing the settings currently being restored (such as **Group: UserSettings\SystemPresets\Service**) on the **Backup & Restore** screen. The system also displays **BackupRestore Running** on the lower left of the screen.

When the process is complete, the system displays a reboot confirmation message box.

4. If **Local Service** settings (such as DICOM settings or machine-specific settings) do not need to be restored/copied, then reboot the system and exit this procedure.
5. If **Local Service** settings (such as DICOM settings or machine-specific settings) must be restored/copied, then do not reboot the system. Continue this procedure.

6. Select the **SW-Settings02** package from the **Archive** drop-down menu and then select the required item(s) from the **Group** drop-down menu.

Note: You can select multiple items using the **Ctrl** and/or **Shift** keys on the keyboard.

To restore/copy...	Select these SW-Settings02 group item(s):
A. All system settings to the same system	(all)  Caution: Do not restore all group items when copying settings from another system. Some group items contain machine-specific data.
B. All system settings (except machine-specific data) to another system	<ul style="list-style-type: none"> ▪ UserSettings ▪ Service\Applications\WorklistResults ▪ Service\LocalHost\SiteInfo ▪ Service\Service\AutoTransfers ▪ Service\Service\FTP ▪ Service\Service\Mail ▪ Service\DICOM\<all items except General>  Caution: Do not select the Service\DICOM\General item. This group item contains machine-specific data.
C. User-defined exam types	(none)
D. System presets and user-defined exam types	(none)
E. Configuration settings for DICOM devices	<ul style="list-style-type: none"> ▪ Service \DICOM \ImportExportDirectories ▪ Service \DICOM \HISRISNodes ▪ Service \DICOM \LUTFiles ▪ Service \DICOM \PrintDevices ▪ Service \DICOM \NetworkNodes ▪ Service \DICOM \OfflineDevices  Caution: Do not select the Service\DICOM\General item. This group item contains machine-specific data.

7. Select **Go** at the bottom of the screen to start the restore process.

During the backup/restore process, the system indicates progress by listing the settings currently being restored (such as **Group: Service\Service\FTP**) on the **Backup & Restore** screen. The system also displays **BackupRestore Running** on the lower left of the screen.

The system response to completion of the restore process depends on the settings being restored:

- If only the configuration settings for DICOM devices were restored, then the system displays **End Restore** (in blue) on the screen and displays a reboot confirmation message box.
 - If other settings listed above were restored, then the system automatically reboots.
8. If the system does not automatically reboot, then reboot the system.
 9. Remove the CD from the compact disk drive.

Selecting Multiple Items

You can select multiple items from the **Group** drop-down menu during the restore/copy process.

To select several nonconsecutive items:

- Select the first item and then press and hold the **Ctrl** key on the keyboard while selecting additional items.

To select a block of consecutive items (or to select all displayed items):

- Select the first item, scroll to the last item, and then press and hold the **Shift** and **Ctrl** keys on the keyboard while selecting the last item.



Shift.

2 Accessories and Options

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Accessories and Options

The only Siemens-authorized accessories and options for the SONOLINE Antares™ ultrasound imaging system are described in this chapter. Specific system configurations and options are organized by operating voltages (230V, 115V, and 100V) and video standards (CCIR/PAL and EIA/NTSC).

⚠ WARNING: Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (e.g., EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standard EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output port configures a medical system and is therefore responsible that the system complies with the requirements of the system standard EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in this chapter. If in doubt, consult Siemens service department or your local Siemens representative.

Note: To ensure compliance with the Medical Device Directive, use only the devices listed in this chapter with your SONOLINE Antares ultrasound imaging system.

230V, 115V, and 100V

- SONOLINE Antares Ultrasound Imaging System with StellarPlus™ performance package software

Supports curved array, linear array, phased (sector) array and endocavity transducers, Multi-D™ and Hanafy Lens transducer technologies, Ensemble™ Tissue Harmonic Imaging (THI), recordable compact disk drive (CD-R), high-density hard disk, biopsy capabilities, and DICOM software. Also supports system options.

Language-specific Operating System

Includes the operating and general imaging system software, a preset data disk, language-specific keyboards, control panel overlays and system Operating Instructions.

- English Language Operating System
- German Language Operating System
- French Language Operating System
- Spanish Language Operating System
- Italian Language Operating System

Options for SONOLINE Antares Ultrasound imaging systems, 230V, 115V, and 100V

- Universal Modem, MT5634MU
- ECG, U.S.A. version
- ECG (EKG), European version
- Footswitch
- SieScape™ Panoramic Imaging option
- Color SieScape™ Panoramic Imaging option (requires SieScape™ Panoramic Imaging software)
- SieClear™ Multi-View Spatial Compounding option
- 3-Scape™ Real-Time 3D Imaging option
- TEQ™ technology option
- Cadence™ Contrast Agent Imaging option

Transducers

Curved Array

- CX5-2 (Multi-D)
- CH6-2 (Hanafy Lens)
- C5-2

Linear Array

- VFX9-4 (Multi-D)
- VFX13-5 (Multi-D)
- VF7-3
- VF10-5
- VF13-5

Phased Array

- PH4-1 (Hanafy Lens)
- P10-4

Specialty

- EC9-4

Transducer Accessories

- Transducer Sheaths:
 - Non-sterile, for use with EC9-4 transducer
 - Sterile, for use with EC9-4 transducer
 - Sterile, compatible with all transducers except endocavity transducers
- Disposable Standoff Gel Pad
- Disposable Needle Guide Clips
- SG-1 Needle Guide Kit for CX5-2, C5-2 transducers
- SG-2 Needle Guide Kit for PH4-1 transducer
- SG-3 Needle Guide Kit for VFX9-4, VF7-3, VF10-5 transducers
- SG-4 Needle Guide Kit for VFX13-5, VF13-5 transducers
- SG-5 Needle Guide Kit for CH6-2 transducer
- EC-1 Needle Guide Kit (reusable) for EC9-4 transducer
- EC9-4 Disposable Endocavity Needle Guide for EC9-4 transducer
- Coupling Agent (Gel):
 - 0.25 Liter
 - 5 Liter
 - Sterile Packages

Digital Documentation Devices

- On-Board Black and White Printer Assembly, P91DW
- On-Board Color Printer Assembly, CP770DW
- On-Board Color Printer Assembly, CP800DW
- External Black and White Printer Assembly, P91DW
- External Color Printer Assembly, CP770DW
- External Color Printer Assembly, CP800DW

Analog Documentation Devices

- On-Board NTSC VCR Assembly, SVO-9500MD
- On-Board PAL VCR Assembly, SVO-9500MDP
- External NTSC VCR Assembly, SVO-9500MD
- External PAL VCR Assembly, SVO-9500MDP

Brackets

- Color Printer
- VCR
- Black and White Printer
- Black and White Printer and Color Printer
- Black and White Printer and VCR
- Color Printer and VCR

Consumables

- Black and White Paper, P91DW
- Print Media, CP770DW
- Print Media, CP800DW
- Cleaning Sheets, Black and White Printer
- Disposable ECG (EKG) Electrodes (50 pcs)
- 650 MB CD-R Disks (box of 10)
- SVHS Videotapes

Keyboards

There are different keyboards available for the SONOLINE Antares ultrasound imaging system:

English



Example of English keyboard.

German



Example of German keyboard.

French



Example of French keyboard.

Spanish



Example of Spanish keyboard.

Italian



Example of Italian keyboard.

Swedish/Finnish



Example of Swedish/Finnish keyboard.

Norwegian



Example of Norwegian keyboard.

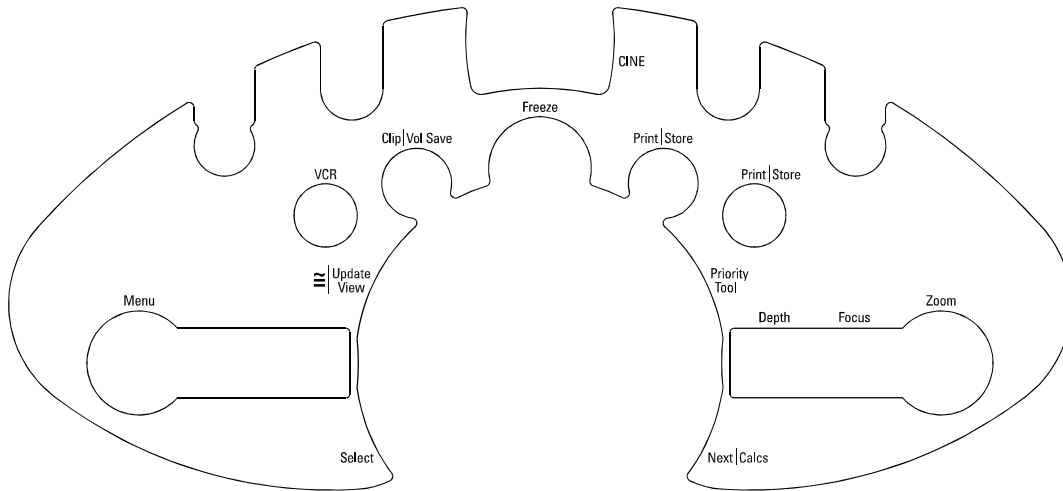
Danish



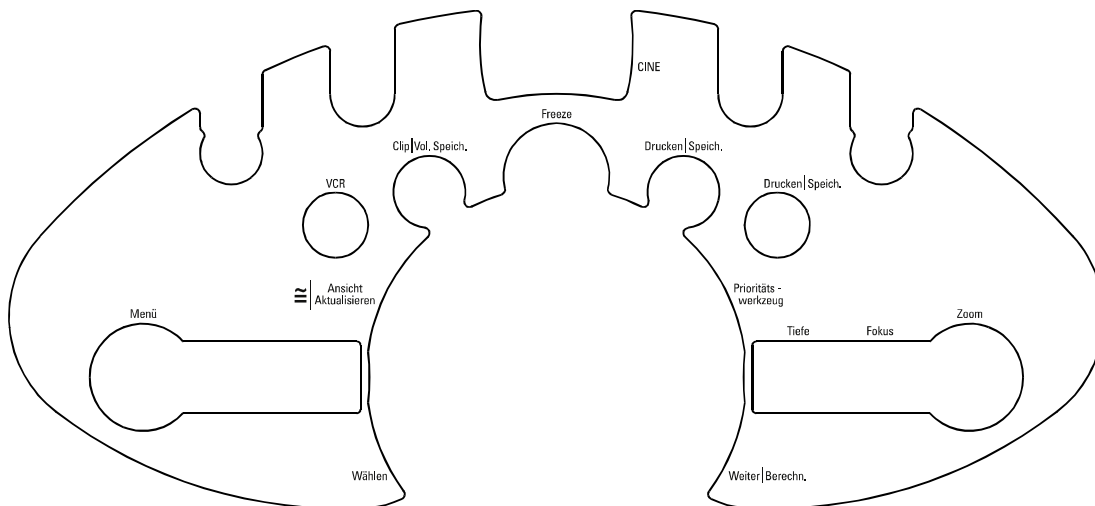
Example of Danish keyboard.

Control Panel Overlays

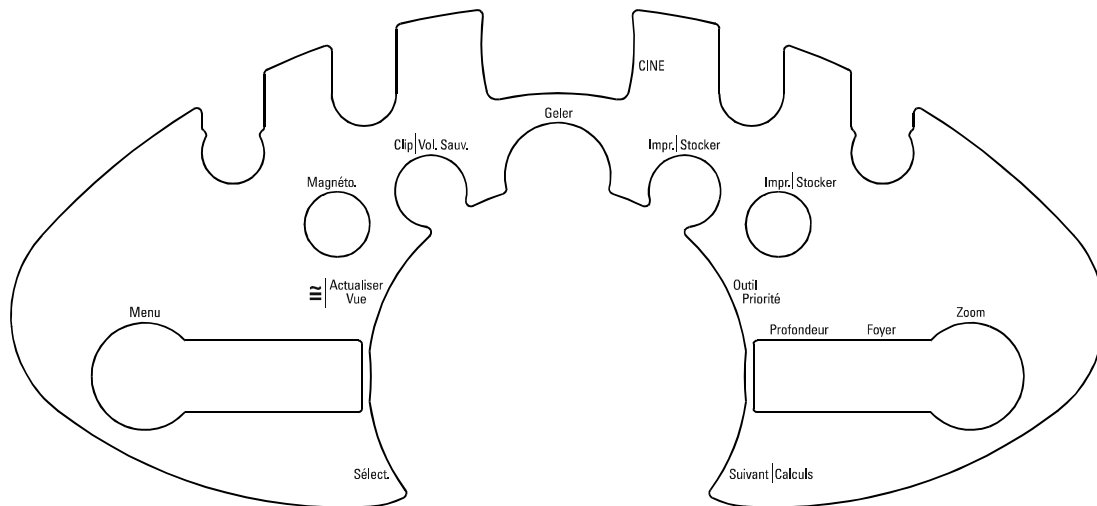
Language overlays for the control panel are available. The locations and functions of the keys and controls are not impacted by the overlay.



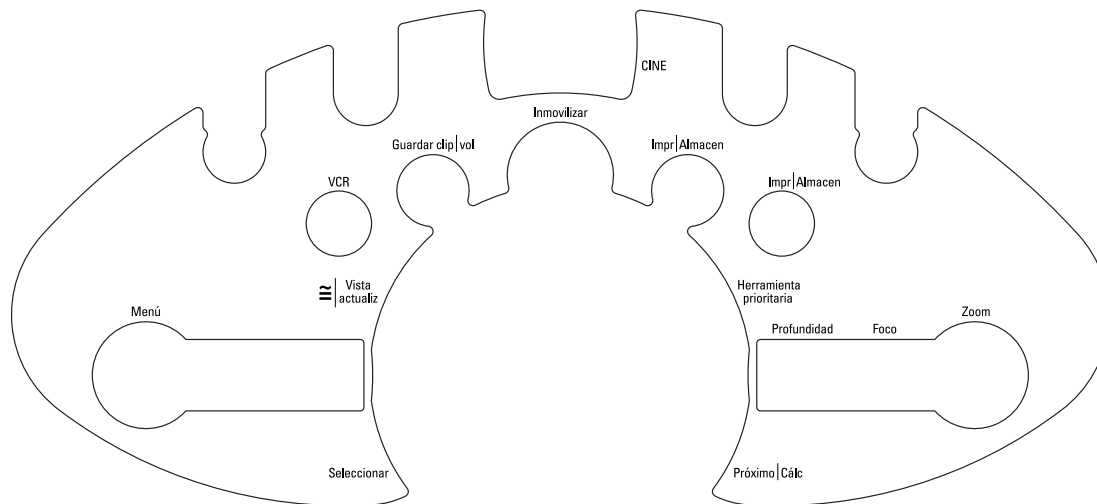
Example of English overlay.



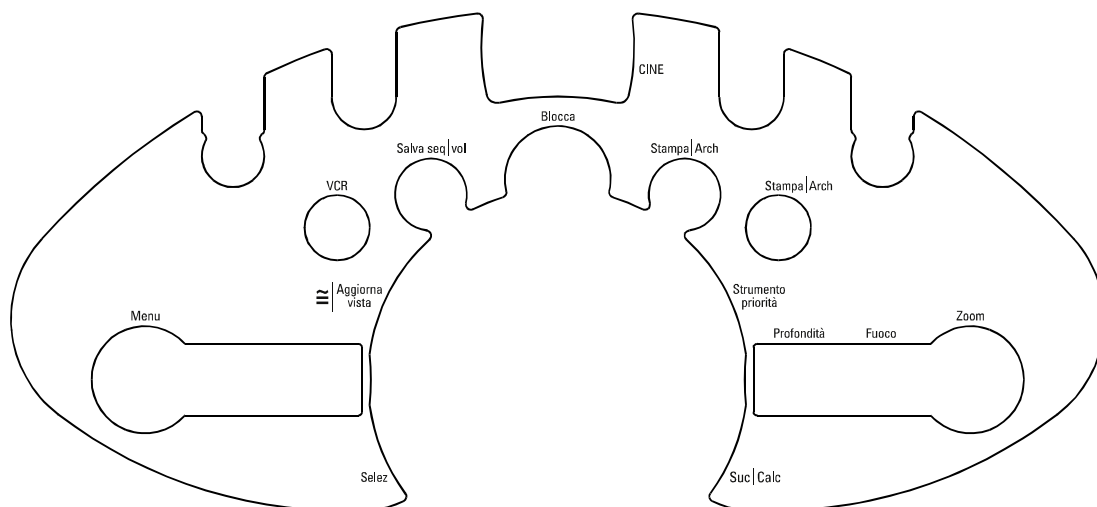
Example of German overlay.



Example of French overlay.



Example of Spanish overlay.



Example of Italian overlay.

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Clinical References ■ Obstetric

Simple Gestational Age Calculations

Abdominal Circumference (AC)

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497, 1984.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Lasser DM, Peisner DB, Vollebergh J, Timor-Tritsch I. "First-trimester fetal biometry using transvaginal sonography." *Ultrasound in Obstetrics and Gynecology* 3:104-108, 1993.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

Anterior-Posterior Abdominal Diameter x Transabdominal Diameter (APADxTAD)

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Binocular Distance (Binoc D)

Jeanty P, Cantraine F, Cousaert E, Romero R, Hobbins JC. "The Binocular Distance: A New Way to Estimate Fetal Age." *Journal of Ultrasound in Medicine* 3:241, 1984.

Tongsong T, Wanapirak C, Jesadapornchai S, Tathayathikom E. "Fetal binocular distance as a predictor of menstrual age." *International Journal of Gynecology and Obstetrics* 38:87-91, 1992.

Biparietal Diameter (BPD)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Hansmann M, Hackelöer B-J, Staudach A. *Ultrasound Diagnosis in Obstetrics and Gynecology*. New York: Springer-Verlag, 1986, English Edition (ISBN 0-387-15384-9); p. 168-176, 438.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Lasser DM, Peisner DB, Vollebergh J, Timor-Tritsch I. "First-trimester fetal biometry using transvaginal sonography." *Ultrasound in Obstetrics and Gynecology* 3:104-108, 1993.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

Rempen A. "Biometrie in der Frühgravidität (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." *Der Frauenarzt* 32:425-430, 1991.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Clavicle Length (Clavicle)

Yarkoni S, Schmidt W, Jeanty P, Reece EA, Hobbins JC. "Clavicular Measurement: A New Biometric Parameter for Fetal Evaluation." *Journal of Ultrasound in Medicine* 4:467-470, 1985.

Crown Rump Length (CRL)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

Hadlock FP, Shah YP, Kanon DJ, Lindsey JV. "Fetal Crown-Rump Length: Reevaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution Real-Time US." *Radiology* 182(2):501-505, 1992.

Hansmann M, Schuhmacher H, Foebus J: *Ultraschallbiometrie der fetalen Scheitelsteißlänge in der ersten Schwangerschaftshälfte*, Geburtsh. u. Frauenheilk 1979; 39:656-666.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Lasser DM, Peisner DB, Vollebergh J, Timor-Tritsch I. "First-trimester fetal biometry using transvaginal sonography." *Ultrasound in Obstetrics and Gynecology* 3:104-108, 1993.

Rempen A. "Biometrie in der Frühgravidität (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." *Der Frauenarzt* 32:425-430, 1991.

Robinson HP and Fleming JEE. "A critical evaluation of sonar 'crown-rump length' measurements." *British Journal of Obstetrics and Gynaecology* 82:702-710, 1975.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Femur Length (FL)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Jeanty P, Rodesch F, Delbeke D, Dumont JE. "Estimation of Gestational Age from Measurements of Fetal Long Bones." *Journal of Ultrasound in Medicine* 3:75-79, 1984.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Warda, AH, Deter, RL, Rossavik, IK, Carpenter, RJ, Hadlock, FP, "Fetal Femur Length: A Critical Re-evaluation of Relationship to Menstrual Age," *Obstetrics & Gynecology*, July 1985, Vol. 66, No. 1, p. 69-75.

Foot Length (Foot)

Mercer BM, Sklar S, Shariatmadar A, Gillieson MS, Dalton ME. "Fetal foot length as a predictor of gestational age." *American Journal Obstetrics Gynecology* 156(2):350-355, 1987.

Gestational Sac Diameter (GSD)

Rempen A. "Biometrie in der Frühgravidität (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." *Der Frauenarzt* 32:425-430, 1991.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Head Circumference (HC)

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Hansmann M, Hackelöer B-J, Staudach A. *Ultrasound Diagnosis in Obstetrics and Gynecology*. New York: Springer-Verlag, 1986, English Edition (ISBN 0-387-15384-9); p. 168-176, 438.

Lasser DM, Peisner DB, Vollebergh J, Timor-Tritsch I. "First-trimester fetal biometry using transvaginal sonography." *Ultrasound in Obstetrics and Gynecology* 3:104-108, 1993.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

Humerus Length (Humerus)

Jeanty P, Rodesch F, Delbeke D, Dumont JE. "Estimation of Gestational Age from Measurements of Fetal Long Bones." *Journal of Ultrasound in Medicine* 3:75-79, 1984.

Tibia Length (Tibia)

Jeanty P, Rodesch F, Delbeke D, Dumont JE. "Estimation of Gestational Age from Measurements of Fetal Long Bones." *Journal of Ultrasound in Medicine* 3:75-79, 1984.

Ulna Length (Ulna)

Jeanty P, Rodesch F, Delbeke D, Dumont JE. "Estimation of Gestational Age from Measurements of Fetal Long Bones." *Journal of Ultrasound in Medicine* 3:75-79, 1984.

Composite Gestational Age Calculations

Abdominal Circumference, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Biparietal Diameter, Abdominal Circumference

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Biparietal Diameter, Abdominal Circumference, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Biparietal Diameter, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Biparietal Diameter, Head Circumference

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Biparietal Diameter, Head Circumference, Abdominal Circumference

Hadlock FP, Deter RL, Harrist RB, Park SK, "Fetal head circumference: relation to menstrual age," *American Journal of Roentgenology* 1982; 138:647-653.

Biparietal Diameter, Head Circumference, Abdominal Circumference, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Fetal head circumference: relation to menstrual age," *American Journal of Roentgenology* 1982; 138:647-653.

Biparietal Diameter, Head Circumference, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Head Circumference, Abdominal Circumference

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Head Circumference, Femur Length

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Estimated Fetal Weight Calculations

Abdominal Circumference, Femur Length

Hadlock FP, Harrist RB, Sharman RS, Deter RL, Park SK. "Estimation of fetal weight with the use of head, body, and femur measurements – A prospective study." *American Journal of Obstetrics and Gynecology* 151:333, 1985.

Biparietal Diameter, Abdominal Circumference

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

Shepard MJ, Richards VA, Berkowitz RL, Warsof SL, Hobbins JC. "An evaluation of two equations for predicting fetal weight by ultrasound." *American Journal of Obstetrics and Gynecology*. 142(1):47-54, 1982.

Biparietal Diameter, Abdominal Circumference, Femur Length

Hadlock FP, Harrist RB, Sharman RS, Deter RL, Park SK. "Estimation of fetal weight with the use of head, body, and femur measurements – A prospective study." *American Journal of Obstetrics and Gynecology* 151:333-337, 1985.

Biparietal Diameter, Anterior-Posterior Abdominal Diameter, Transabdominal Diameter, Femur Length

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Biparietal Diameter, Fetal Trunk Area, Femur Length

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

Biparietal Diameter, Head Circumference, Abdominal Circumference, Femur Length

Hadlock FP, Harrist RB, Sharman RS, Deter RL, Park SK. "Estimation of fetal weight with the use of head, body, and femur measurements – A prospective study." *American Journal of Obstetrics and Gynecology* 151:333-337, 1985.

Head Circumference, Abdominal Circumference, Femur Length

Hadlock FP, Harrist RB, Sharman RS, Deter RL, Park SK. "Estimation of fetal weight with the use of head, body, and femur measurements – A prospective study." *American Journal of Obstetrics and Gynecology* 151:333-337, 1985.

Ratio Calculations

Cephalic Index (CI)

Hadlock FP, Deter RL, Carpenter RJ, Park SK. "Estimating Fetal Age: Effect of Head Shape on BPD." *American Journal of Roentgenology* 137:83-85, 1981.

Head Circumference/Abdominal Circumference ■ Ratio

Campbell S. "Ultrasound measurement of the fetal head to abdomen circumference ratio in the assessment of growth retardation" *Brit J Obstet Gynaecol*, 84:165-174, 1977.

Femur Length/Abdominal Circumference ■ Ratio

Hadlock FP, Deter RL, Harrist RB, Roecker E, Park SK. "A Date-Independent Predictor of Intrauterine Growth Retardation: Femur Length/Abdominal Circumference Ratio." *American Journal of Roentgenology* 141: 979-984, 1983.

Femur Length/Biparietal Diameter ■ Ratio

Hohler CW, Quetel TA. "Comparison of ultrasound femur length and biparietal diameter in late pregnancy." *American Journal of Obstetrics and Gynecology* 141(7):759-702, 1981.

Femur Length/Head Circumference ■ Ratio

Hadlock, Harrist, Shah, Seung; "The Femur Length/Head Circumference Relation in Obstetric Sonography"; *J Ultrasound Med* 3:439-442, 1984.

Lateral Ventricle Width/Hemispheric Width ■ Ratio

Johnson ML, Dunne MG, Mack LA, Rashbaum CL. "Evaluation of Fetal Intracranial Anatomy by Static and Real-Time Ultrasound." *Journal of Clinical Ultrasound* 8:311-318, 1980.

Transcerebellar Diameter/Abdominal Circumference ■ Ratio

Meyer WJ, Gauthier DW, Goldenberg B, Santolaya J, Sipos J, Cattledge F. "The Fetal Transverse Cerebellar Diameter/Abdominal Circumference Ratio: A Gestational Age-Independent Method of Assessing Fetal Size." *Journal of Ultrasound in Medicine* 12:379-382, 1993.

Growth Analysis

Abdominal Circumference (AC)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

(CFEF) Créquat J, Duyme M, Brodaty G. "Tables de croissance fœtale par le Collège français d'échographie fœtale (CFEF) et l'Inserm U 155" *Gynécol Obsrér Fertil* 28:435-445, 2000.

Chitty, LS, Altman, DG, "Charts of Fetal Size: 3. Abdominal Measurements," *British Journal of Obstetrics & Gynaecology*, Jan. 1994, vol. 101, p. 125-131.

Deter, RL, Harrist, RB, Hadlock, FP, Carpenter, RJ, "Fetal Head and ABdominal Circumferences: II. A Critical Reevaluation of the Relationship to Menstrual Age," *Journal Clinical Ultrasound*, Oct. 1982, 10:p.365-372.

Grumbach, K, Coleman, BG, Arger, PH, Mintz, MC, Gabbe, SV, Mennuti, MT, "Twin and Singleton Growth Patterns Compared Using US," *Radiology*, 1986, Vol. 158, p.237-241.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Jeanty P, Cousaert E, Cantraine F. "Normal growth of the abdominal perimeter." *American Journal of Perinatology* 1:179, 1984.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

APADxTAD

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Biparietal Diameter (BPD)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

(CFEF) Créquat J, Duyme M, Brodaty G. "Tables de croissance fœtale par le Collège français d'échographie fœtale (CFEF) et l'Inserm U 155" *Gynécol Obsrér Fertil* 28:435-445, 2000.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Hansmann M, Hackelöer B-J, Staudach A. *Ultrasound Diagnosis in Obstetrics and Gynecology*. New York: Springer-Verlag, 1986, English Edition (ISBN 0-387-15384-9); p. 168-176, 438.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Lasser DM, Peisner DB, Vollebergh J, Timor-Tritsch I. "First-trimester fetal biometry using transvaginal sonography." *Ultrasound in Obstetrics and Gynecology* 3:104-108, 1993.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

Rempen A. "Biometrie in der Frühgravidität (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." *Der Frauenarzt* 32:425-430, 1991.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Chitty (Outer to Inner)

Chitty, LS, Altman, DG, "Charts of Fetal Size: 2. Head Measurements," *British Journal of Obstetrics & Gynaecology*, Jan. 1994, vol. 101, p. 35-43.

Chitty (Outer to Outer)

Chitty, LS, Altman, DG, "Charts of Fetal Size: 2. Head Measurements," *British Journal of Obstetrics & Gynaecology*, Jan. 1994, vol. 101, p. 35-43.

Grumbach (Twin)

Grumbach, K, Coleman, BG, Arger, PH, Mintz, MC, Gabbe, SV, Mennuti, MT. "Twin and Singleton Growth Patterns Compared Using US," *Radiology*, 1986, Vol. 158, p.237-241.

Crown Rump Length (CRL)

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

Hadlock FP, Shah YP, Kanon DJ, Lindsey JV. "Fetal Crown-Rump Length: Reevaluation of Relation to Menstrual Age (5-18 weeks) with High-Resolution Real-Time US." *Radiology* 182(2):501-505, 1992.

Hansmann M, Schuhmacher H, Foebus J: *Ultraschallbiometrie der fetalen Scheitelsteißlänge in der ersten Schwangerschaftshälfte*, Geburtsh. u. Frauenheilk 1979; 39:656-666.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

Rempen A. "Biometrie in der Frühgravidität (I. Trimenon) (Biometry in Early Pregnancy (1st Trimester))." *Der Frauenarzt* 32:425-430, 1991.

Robinson HP and Fleming JEE. "A critical evaluation of sonar 'crown-rump length' measurements." *British Journal of Obstetrics and Gynaecology* 82:702-710, 1975.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Estimated Fetal Weight (EFW)

Hadlock FP, Harrist RB, Martinez-Poyer J. "In Utero Analysis of Fetal Growth: A Sonographic Weight Standard." *Radiology* 181:129-133, 1991.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Jeanty P, Cantraine F, Romero R, Cousaert E, Hobbins JC. "A Longitudinal Study of Fetal Weight Growth." *Journal of Ultrasound in Medicine* 3:321-328, 1984.

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Yarkoni S, Reece EA, Holford T, O'Connor TZ, Hobbins JC. "Estimated Fetal Weight in the Evaluation of Growth in Twin Gestations: A Prospective Longitudinal Study." *Obstetrics Gynecology* 69:636-639, 1987.

Femur Length (FL)

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

(CFEF) Créquat J, Duyme M, Brodaty G. "Tables de croissance fœtale par le Collège français d'échographie fœtale (CFEF) et l'Inserm U 155," *Gynécol Obsrér Fertil* 28:435-445, 2000.

Chitty, LS, Altman, DG, "Charts of Fetal Size: 4. Femur Length," *British Journal of Obstetrics & Gynaecology*, Jan. 1994, vol. 101, p. 132-135.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Japan Society of Ultrasonics in Medicine (JSUM) "Standardization of Fetometry and Official Announcement of Diagnostic Guidelines." *J. Med. Ultrasonics* 28:844-872, 2001.

Jeanty P, Dramaix-Wilmet M, van Kerkem J, Petroons P, Schwes J. "Ultrasound Evaluation of Fetal Limb Growth, Part II." *Radiology* 1982; 143:751-754.

Merz E, Kim-Kern MS, Pehl S, "Ultrasonic mensuration of fetal limb bones in the second and third trimesters" *Journal of Clinical Ultrasound* 15:175-183, 1987.

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Warda, AH, Deter, RL, Rossavik, IK, Carpenter, RJ, Hadlock, FP, "Fetal Femur Length: A Critical Re-evaluation of Relationship to Menstrual Age," *Obstetrics & Gynecology*, July 1985, Vol. 66, No. 1, p. 69-75.

Fetal Trunk Area (FTA)

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

Gestational Sac Diameter (GSD)

Hellman, LM, Kobayashi M, Fillisti L, Lavenhar M: "Growth and development of the human fetus prior to the twentieth week of gestation" *American Journal Obstetrics Gynecology*, 103:789-800, 1969.

(Tokyo) Masuda H, Shinozuka N, Okai T, Mizuno M. "Diagnosis of the Week of Pregnancy and Prognosis." *Perinatal Care* 8:719-726.

Head Circumference (HC)

ASUM; Australian Society of Ultrasound Medicine (ASUM) – *Policy on Obstetric Exams*, 1998.

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

(CFEF) Créquat J, Duyme M, Brodaty G. "Tables de croissance fœtale par le Collège français d'échographie fœtale (CFEF) et l'Inserm U 155" *Gynécol Obsrér Fertil* 28:435-445, 2000.

Chitty, LS, Altman, DG, "Charts of Fetal Size: 2. Head Measurements," *British Journal of Obstetrics & Gynaecology*, Jan. 1994, vol. 101, p. 35-43.

Deter, RL, Harrist, RB, Hadlock, FP, Carpenter, RJ, "Fetal Head and Abdominal Circumferences: II. A Critical Reevaluation of the Relationship to Menstrual Age," *Journal Clinical Ultrasound*, Oct. 1982, 10:p.365-372.

Hadlock FP, Deter RL, Harrist RB, Park SK. "Estimating Fetal Age: Computer-Assisted Analysis of Multiple Fetal Growth Parameters." *Radiology* 152:497-502, 1984.

Hadlock FP, Deter RL, Harrist RB, Park SK, "Fetal head circumference: relation to menstrual age," *American Journal of Roentgenology* 1982; 138:647-653.

Hansmann M, Hackelöer B-J, Staudach A. *Ultrasound Diagnosis in Obstetrics and Gynecology*. New York: Springer-Verlag, 1986, English Edition (ISBN 0-387-15384-9); p. 168-176, 438.

Merz E. *Ultrasound in Gynecology and Obstetrics*. Stuttgart and New York: Thieme Medical Publishers, Inc., 1991, p. 312-326.

Head Circumference/Abdominal Circumference (HC/AC)

Campbell S, Thoms A. "Ultrasound measurement of the fetal head to abdomen circumference ratio in the assessment of growth retardation." *British Journal of Obstetrics and Gynaecology*, 84:1650174, 1977.

Humerus Length (HL)

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

Jeanty P, Dramaix-Wilmet M, van Kerkem J, Petroons P, Schwes J. "Ultrasonic Evaluation of Fetal Limb Growth, Part II" *Radiology* 143:751-754, 1982.

Merz E, Kim-Kern M-S, Pehl S. "Ultrasonic Mensuration of Fetal Limb Bones in the Second and Third Trimesters." *Journal of Clinical Ultrasound* 15:175-183, March/April 1987.

(Osaka) Aoki M, Yamada M. "Examining Fetal Growth." *Obstetrics and Gynecology* 47:547-556, 1983.

Occipital Frontal Diameter (OFD)

(ASUM2000) Westerway SC. "Ultrasonic Fetal Measurements: New Australian Standards for the New Millennium." *Aust NZ J Obstet Gynaecol* 40:3:297-302, 2000.

Transabdominal Diameter (TAD)

(CFEF) Créquat J, Duyme M, Brodaty G. "Tables de croissance fœtale par le Collège français d'échographie fœtale (CFEF) et l'Inserm U 155" *Gynécol Obsér Fertil* 28:435-445, 2000.

4 Communications and Networking

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DICOM Communication

The ultrasound system has integrated networked communication capability. Networked communication is in compliance with the Digital Imaging Communications in Medicine (DICOM) 3.0 standard, (also known as ACR/NEMA 3.0).

The ultrasound system supports networked communication with DICOM archive servers, DICOM worklist servers and DICOM documentation devices.

Configuring DICOM

Configuring DICOM should be performed by service personnel trained for DICOM services. Qualified personnel who perform this function must use the ultrasound system **Service** presets menus with a level-one access (no password required). For additional information on user-accessible service presets, refer to the "Reference Guide ■ User-Accessible Service Presets" manual.




Service

RS-232 Serial Port

The system has an RS-232 serial port for connecting to a PC or to a serial printer.

The system has a Parallel port printers for connecting to a printer.

 **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output port configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the Accessories and Options chapter. If in doubt, consult Siemens service department or your local Siemens representative.

Note: Siemens does not support or service any external devices connected to the RS-232 interface. Siemens does not assume responsibility for functionality beyond the scope of this specification.



System Reference

RESOURCES:

Accessories and
Options

Ch 2